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with the same battery, with

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With your ignition switch off

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IF NO DEALER NEAR YOU, USE COUPON

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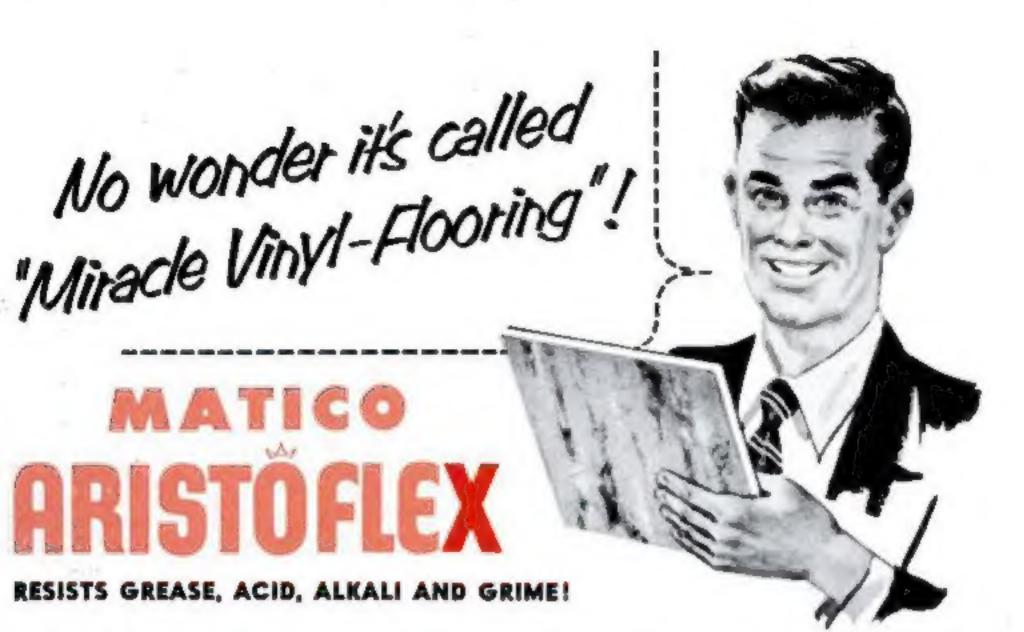
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Oppropries



You've done it often. Call it day-dreaming if you like, but you've seen yourself in a bigger job — giving orders and making decisions — driving off in a smart new car — buying your family a fine home.

There's nothing wrong with dreams. But how about making them come true? You can do it, if you're willing to try!

Look around you. The men who are going places are the trained men. They've learned





#### SMARTEST THING HE EVER DID

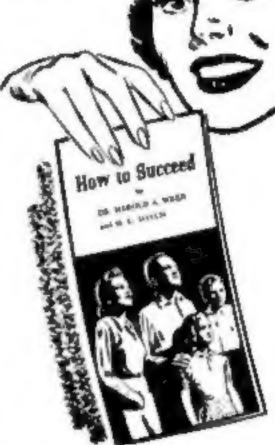
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## He's using the telephone



"Sure . . . I'm looking up the figures right new!" From busy executives to clerks, people in business can work more easily and efficiently with Bell's new Distant Talking Telephone. Small white rectangle is the loudspeaker.

For people who want to keep both hands free when they telephone, Bell Laboratories engineers have devised a new telephone with a sensitive microphone in its base.

To use it, simply press a button. The microphone picks up your voice and sends it on its way. Your party's voice comes to you through a small loudspeaker. Both of your hands are left free!

The volume can be adjusted to suit yourself. If privacy is needed, simply lift the handset; this shuts off the microphone and loudspeaker and you talk as on a regular telephone.

This new development of Bell Telephone Laboratories increases the number of ways your local Bell telephone company can serve in businesses and homes.

## BELL TELEPHONE LABORATORIES





Pencil points to microphone in base of new telephone. Left-hand button controls volume, center one turns set "on" and lights up while in use. The third is an "off" button.

Carrol tel Island

Improving telephone service for America provides careers for creative men in scientific and technical fields

# Weatherstrip with your fingertip

Mortilo WAY!

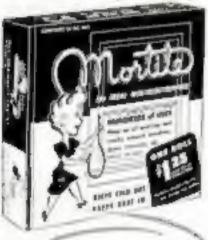


**ELIMINATE UNHEALTHY, fuel-wasting drafts** -Mortite your windows now! Weatherproofs a window in seconds at so little cost! Self-adheres—no tacks or tools just press in place!





SOFT, ROPE-LIKE STRANDS. (34 " diameter). unroll like ribbon, mould into place like modeling clay. Use inside or out-no need to go out in cold to apply. Won't crack, chip or peel. Use over and over-in Spring, hold one end, pull right off. 1,001 other uses! Ideal as gasket, caulker, base for flower stems. Perfect plugger-upper for variety of uses in, around home all year long!



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Letters Raising a Shop Family What kind of satisfaction has Reader Kays

achieved by chasing the wife and kiddles from his hobby shop by means of "racy" pictures on the walls (June, p. 18)?

We're a hobby family (model railroading, tropical fish, crafts, etc.) and will be the first to admit that our three-year-old is more of a hindrance than a help in the shop. But we're learning a priceless lesson of self-



control and are on the road to achieving family unity. The three-year-old has his scaled garden and shop tools and is assimilating all sorts of skills.

MR. AND MRS. JAMES BRADY, Reseda, Calif.

#### A Blood Foud is Settled

In September ["Letters," p. 12], you apologized quite without warrant for having stated that "As the air gets rarer, the blood gets redder."

Your correspondent confused air with oxygen. People living in high altitudes have an increase in the number of red blood cells per unit of blood volume. Hence, the blood does get redder.

Please correct your correction!

IAGO GALDSTON, M. D.,

Carpol ted insered

N. Y. Academy of Medicine, New York

Says the U.S. Air Force School of Aviation Medicine, Randolph Field, Texas:

"Your statement was correct if, by 'redder,' you meant darker red. Your original critic likewise was correct if, by 'bluish,' he

1955 is our 25th anniversory year.

## "OWN a Business" Coupon

DURACLEAN CO., 4-18D Duracless Bldg., Deerfield, III., U.S.A. Without obligation to me, send booklet and letter giving full details. Tell me how I may OWN a growing business of my own built upon satisfied customers.

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If you have longed for the prestige and financial independence of YOUR OWN business, you can now resilize this desire . . , if you can qualify for a Duraclean dealership. We are now enlarging this 24-year-old chain of independently-owned service dealerships which has rapidly grown to a world-wide service.

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We want to assure your success. A Duraclean dealer will train and assist you. He'll reveal his successful plan of building cutomers, He will work with you. This business is easy to learn . . . quickly established.

This is a sound, lifetime business that grows from REPEAT ORDERS and customer RECOMMENDATIONS. Alert dealers can gross an hourly profit of \$5.00 on own service plus \$3.00 on EACH service-man at National Price Guide charges. Mali coupon teday for full details.

## You are Trained in a New Profession ... to Revive, Clean, Protect Home Furnishings

You have the opportunity to steadily increase the income for your family month after month and year after year without waiting for a raise. Duraclean dealers enjoy unusual profit on both materials and labor . . . after paying servicemen or salesmen. Service is rendered IN the home. Some have shops or offices . . . others operate from their home with no overhead expense. No experience is needed. We show you 27 ways to bring customers to you.

Our MUTUAL COOPERATION program gives you many unique and continuous advantages after you are established as your business grows. For example, National Advertising, YOUR services are advertised in magazines like Better Romes & Gardens, Life, McCalls, House & Garden, Maclean's (Canada) and a dozen others. World-wide. Dealerships throughout the world. Copyright and trademark protection. Certificate approves equipment and materials. Products insurance. Elx-year Warranty. Packet Domenstrators. Sales Book. Advertising Falders & Carde. Tested Ads. Ad Cuts & Mats. Store Display Cards. Radio & TV Musical Commercials. Booth Display for YOUR Home Show or Fair. Publicity Program gets FREE local newspaper stories. Primes awarded dealers. Laboratory develops current products, conducts research on NEW products. etc. Buragram bulletins [32 in past 12 mos.) cover every conceivable topic, Resale Service helps dealer (moving, drafted, etc.) sell his business. Annual Conventions. Headquarters. Behind all this is a Hdqs. interested in YOUR personal success.

Almost every building houses a customer needing one or both services. Furniture stores, department stores, interior decorators, uphoisterers and carpet stores develop Duracleaning and Duraproofing jobs from their customers. Auto dealers take orders and have used cars Duracleaned. You have a high hourly income from the day you start . . . sven while still employed.

### What Dealers Say -

Fuller Munree; "I give full time to estimating and supervising. We average \$0 hourly income per service man, but one man today produced \$118.00."

T. Komari (Japan) "Have 1,000,000 yen centract Duracleaning for U.S. Army."

W. Lockiebili. "We've had 20 years of pleasant dealings. I'm 65 but am setting my alghis for 20 more years."

P. Freidinger "Had a big meth-preof business last year; one Joh was \$322,25."

R. Kimbrough: "Finished First White House of Confederacy and am to Duraclean the Governor's Mansion."

H. Satterfield: "Duracleaned chair for largest department store and got order for 60 to 75 chairs, couches and davenports."

E. Schenk: "The customers I had on House and Gardon ada were very pleased. Their furnishings came out beautiful."

A. Pliman: "It is very encouraging that every demonstration has been a sale."

L. Johnson: "Each customer leads to 3 or 4 more. One job two of as cleaned \$125 worth in 5 hours."

More quotations in our liturature.

#### Duraclean Revolutionizes Old Methods

Duraclean's growth to a world-wide service resulted from customer convenience plus its many superiorities over ordinary cleaning. House-wives, clubs, hotels, offices and institutions deeply appreciate not having furnishings out of use for days and weeks.

They are thrilled to see their uphoistery and floor coverings cleaned and revived with a new consideration for its life and beauty. Duraclean doesn't merely clean . . . it restores natural lubrication to wool and other fibers. Colors revive. The re-enlivened rug and carpet pile unmats and rises.

They appreciate the courteous, personalized service of Duraclean craftsmen. Such service is NEWS . . it spreads to friends and neighbors. Customers become your best salesmen.

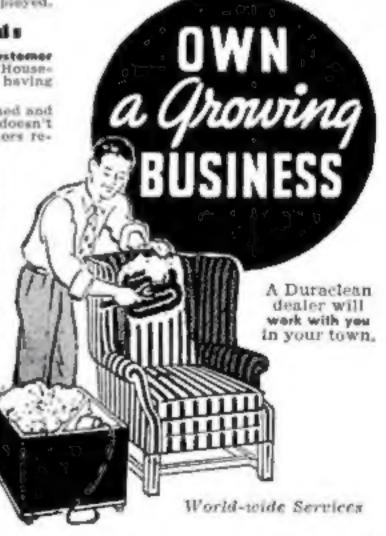
Duraproof: This companion service not only kills moths and carpet beetles..., it is WARRANTED to make labric receilent to both. Damage to household goods and wearing apparel is greater from moths than fire. This modern treatment PROTECTS rugs carpets, upholstery, furs, clothing blankets, plano-felts, auto-interiors, etc.

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DURACLEAN CO., 4-18D Duraclean Bidg., Deerfield, Illinois



meant a purplish red. What actually happens is that the blood, normally bright red, becomes darker with oxygen deficiency at high altitudes,"

#### Laments for the Model A

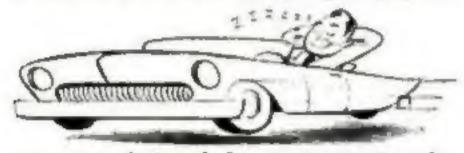
Frank Rowsome's "A Lament for the Model A" [Sept., p. 172] is one of the best articles I've read. It was also very expensive for me: I went out and bought one.

It's a great car, but it took me a couple of days to find out that you can't signal turns with the spark lever and can't throw the gas lever into second gear.

Please, don't let Rowsome write about the Model T-I just can't afford it.

HANS C. JENS, Ypsilanti, Mich.

You can say one thing for the Model A: it had to be driven. Today's plushy push-



carts are designed for incompetents who are no more capable of driving a car than

a B-29. These portable lounge rooms are built for sleeping, not driving.

H. N. WEBSTER, Nutley, N. J.

Discussed Frank Rowsome's article with my teen-age son. I was informed that the Model A was a loose caboose with a dead head, an ignition that delivered a mock shock, a fickle vehicle with centipede speed.

Let me say that my ire's afire.

To work on a Model A you didn't have to be an acrobatic fanatic or an organic mechanic to keep it running cunning. Its simple performance promoted a cool drool instead of a power glower and an insane brain. The jerk it started with wasn't behind the steering wheel.

You youngsters can sorrow for the ear of tomorrow; we bolstered oldsters have had it. W. M. Lidwell, Corpus Christi, Tex.

On my first A, a friend showed me how the shift lever would lift up and swivel against the dash from either neutral or third-gear position. So against the dash was where I had it one Sunday afternoon with four people in the front seat,

Then I hit a hill that called for second

## "Here's the new greaseless way to keep your hair neat all day,"



says Arthur Godfrey

Even Mr. G.'s tousled cowlicks stay put after he uses new Vitalis Hair Tonic with V-7. "It works for me even after a shampoo," he says. "That means it'll work for anybody."

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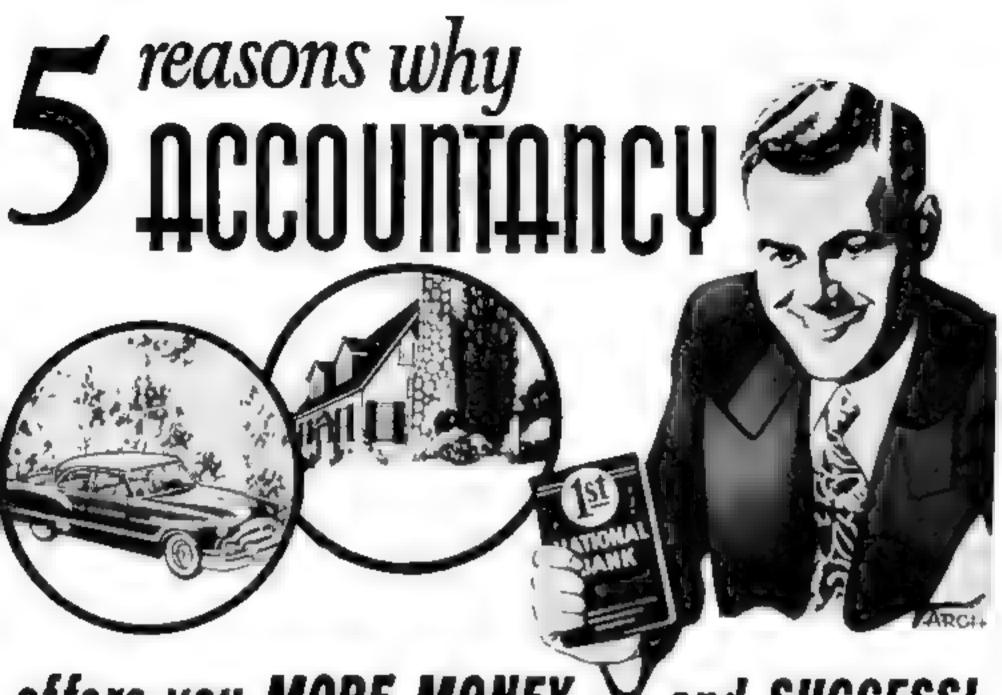
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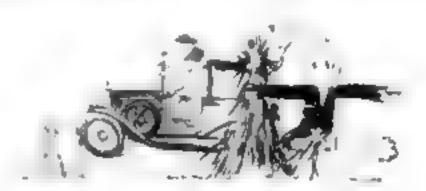
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We were wedged in so tightly that the startled girl couldn't get a full swing at me. Frank D. Hammer, Altadena, Calif.

My Model A was the first delivered in the little Minnesota town of Cannon Falls, It caused such a sensation that the dealer talked me into letting him keep my Tudor as a demonstrator in return for a four-door later. Together we ran through frozen corn fields at 60 miles an hour, fairly leaping the



ditches. By the time the four-door came, I liked the Tudor so well I just kept it.

I put 180,000 miles on it in six years, The man who bought it second-hand stalled it in a snowdrift and had to leave it till spring. When he went to start it, the engine caught at the second twist of the handle.

E. H. Engelbart, Minneapolis

Of more than 400 readers who wrote us about the Model A article, all but 18 just loved it . . . or the car . . . or both. And most of them told tales of their own Model A's, often fondly remembered as Liz, Betsy, Lena, Josephine, Genevieve, etc.

Do people still give their cars names?

#### Unusual Weather

The map on pages 114-115 of your November issue shows the Southwest as wet states and the southeastern states as dry. Isn't that just backwards?

WILLIAM GORDON, Stamford, Conn.

Exactly backwards-due to a pair of carelessly transposed captions.

#### Furnace vs. Boiler

We thought your comprehensive article "What's New in Home Heating" [Oct., p. [149] was excellent-with one exception: you apparently are using the term "furnace" to cover home-heating boilers as well,

Actually, a furnace is used only with socalled warm-air heating systems, in which

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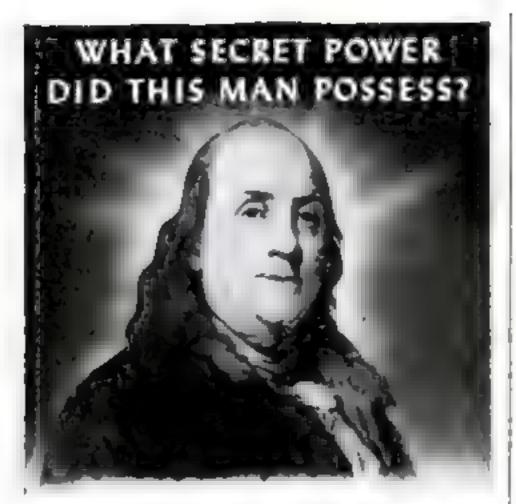
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#### Ouch, That Careless Artist!



In "Keeping the Basement Shipshape" [Sept., p. 125], there is an item about installing a buzzer in the cellar. Maybe the idea is a good one, but the picture of the man watching the

buzzer, and taking his eyes from a saw which is running, gave me the willies! Let's hope the artist still has all his fingers.

JOHN LACY, Philadelphia

#### Exposing a Heavenly Hoax

Not long ago I read in the papers that two meteorites have become satellites of the earth and are revolving around us—one 400 miles out in space, the other about 600.

This story sounded pretty weird to me, but it said the Air Force had got excited and sent Dr. Lincoln La Paz of the University of New Mexico dashing over to Palomar Observatory in California to check up. Dr. La Paz reportedly identified the objects as meteorites and not man-made satellites.

Can this story possibly be true?

WOODRUFF DUNHAM, Oakland, Calif.

POPULAR SCIENCE MONTHLY had representatives run this report down.

First, the Air Force declared that it wasn't the least bit excited about any satellite meteorites now, and never had been

Second, the University of New Mexico reported that Dr. La Paz said the story was "a complete hoax."

Third, Dr. Milton Humason, secretary of Mt. Wilson and Palomar Observatories, said that Dr. La Paz had not visited Palomar.

Astronomers generally were pretty contemptuous of the printed story, since none of them had ever seen a natural object like those described, and they were not at all convinced that any man-made object, at this stage of the game, could perform in the orderly fashion described in the press.



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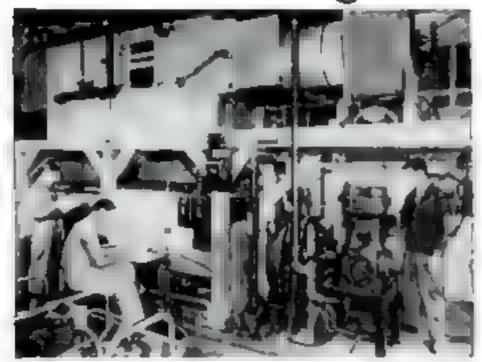
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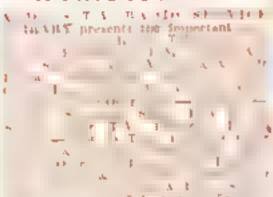
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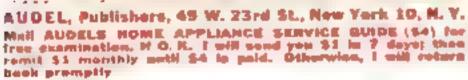
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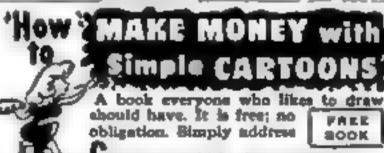
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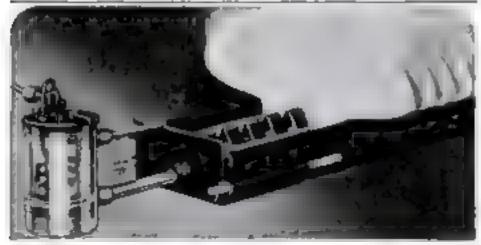
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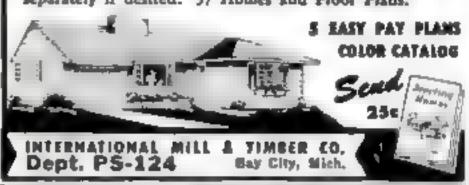
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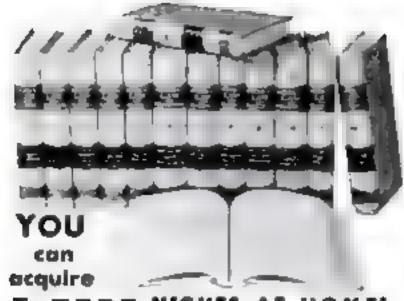
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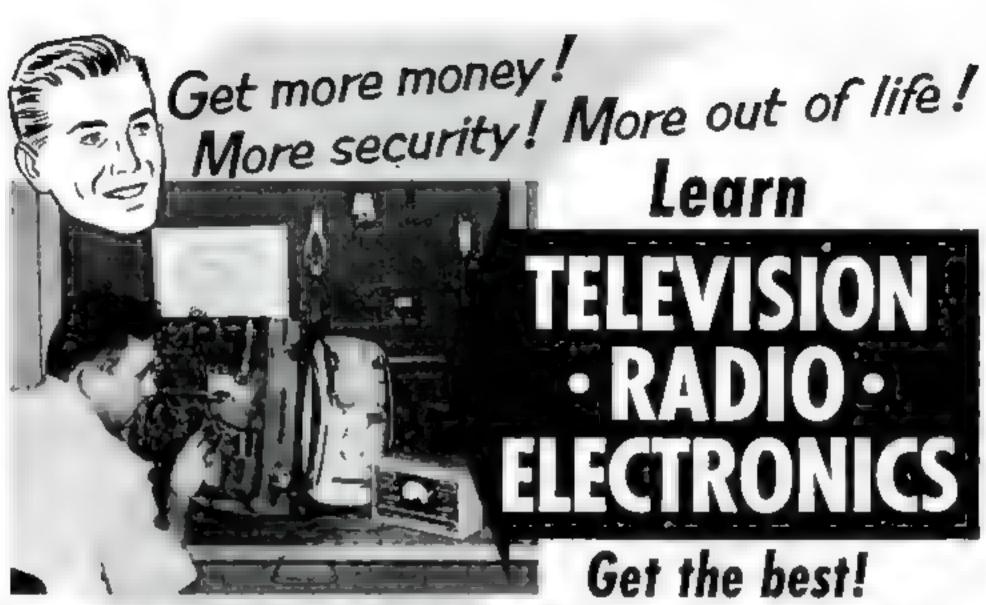


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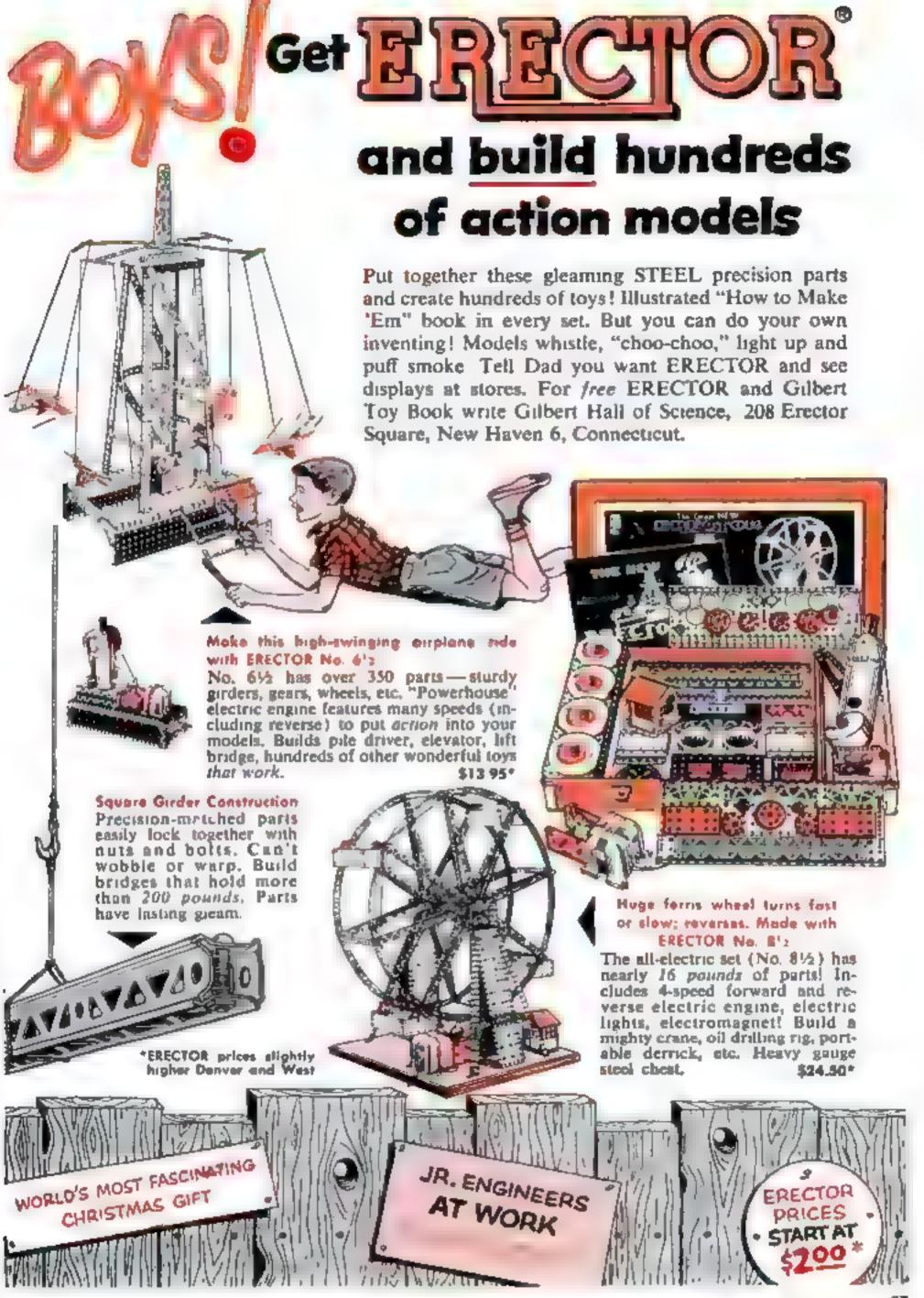


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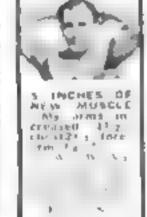
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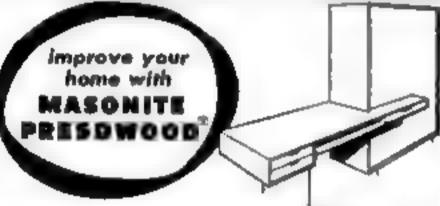
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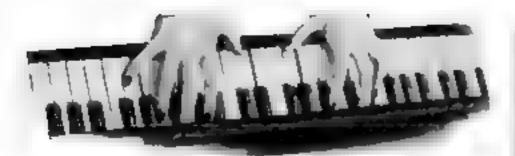
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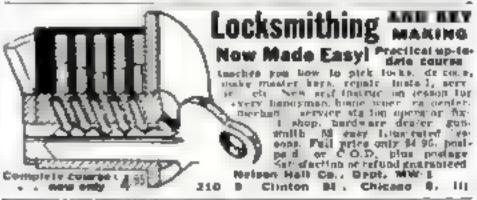
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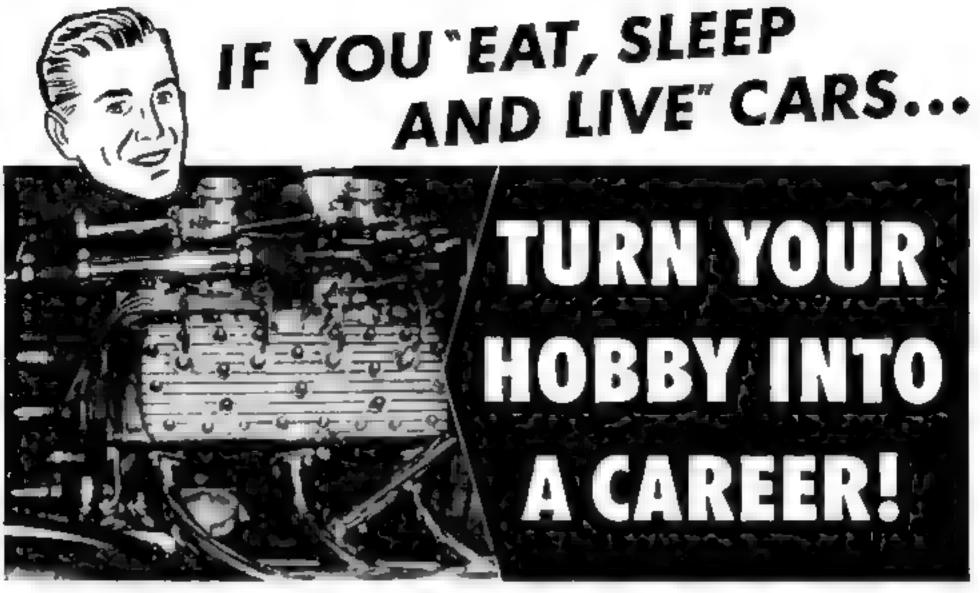
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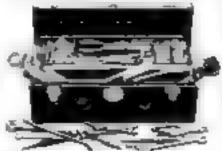


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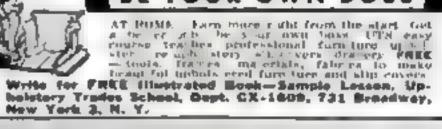
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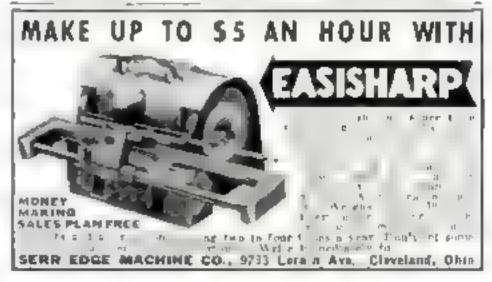


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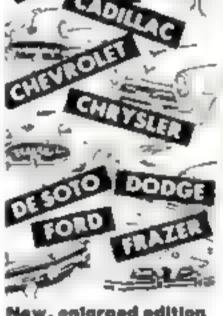
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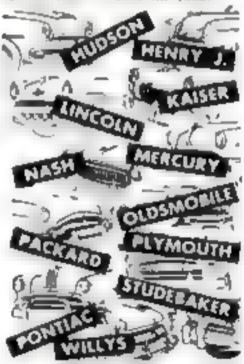


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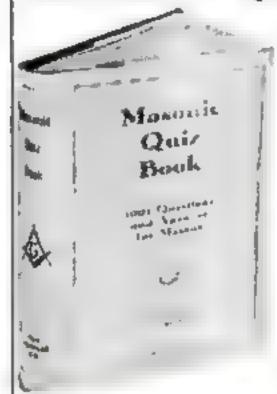
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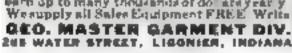
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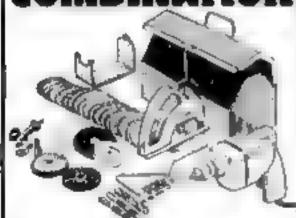
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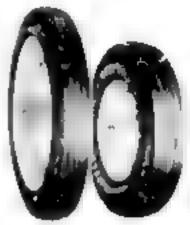
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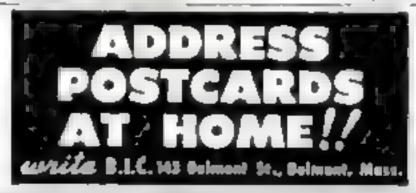




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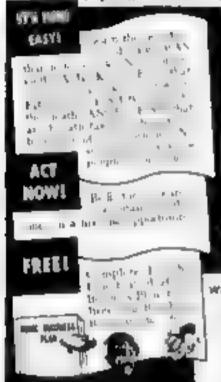
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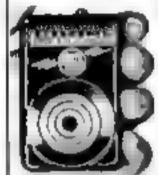
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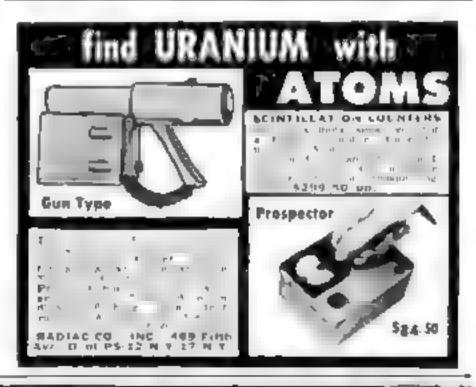
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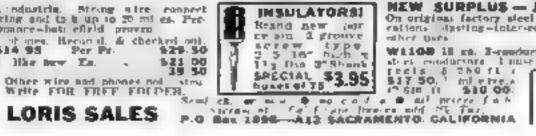


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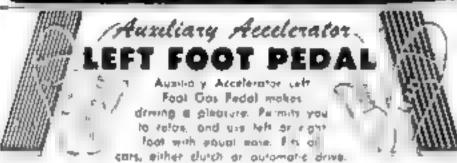
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damage to your engine!

Because hot oil, under pressure, often forces "channels" in rag or paper filter packs, these abrasives get through. That's why a team of researchers developed a new material for oil filters: porous bronze.

This new filter material is made of millions of microscopic balls fused together. No amount of oil can force a channel in it. No dangerous abrasive particles can get through. It doesn't soak up valuable

oil additives as absorbent filters do. And you never change it! You simply rinse it in gasoline and keep on using it for 10,000, 100,000 and more miles of driving. It's called the Life-Time filter.

The cost? About the same as a couple of throwaway filter packs. In addition to saving the cost of filter pack replacement, you save the quart of oil soaked up and thrown away with ordinary filter packs and — most important — you save money on engine repairs by filtering out dangerous abrasives.

#### OPPORTURITY FOR DEALERS ARE DISYRIBUYORS

A dealer and distributor network is now being formed to handle demand generated by advertising and editorial features in national magazines. If you can qualify, you can be first with the most exciting automotive product of this decade, to win new customers and build a substantial business. These valued franchises are not being sold; they are awarded on the basis of ability to grow with us. For complete details, write or wire: Continental Manufacturing Corporation, Dept FPS-12, Washington Blvd. & Motor Avenue, Culver City, Calif.

#### **Evolution of Bronze Filter Design**

1. "Tin Can"

2. Rigid Cone





1. First crude attempts to design a bronze filter simply unitated the shape of the ordinary throwsway pack. Because of its basic structural weakness and the danger that sediment packing between the element and the case might critically reduce oil pressure, all attempts to "improve" this design were abandoned, even though it was relatively cheap to manufacture.

2. After considering almost every geometric shape, the cone was selected as the most rigid and was used for the Life-Time filter. This design also allows the sediment to drop to the bottom of the case, clear of the element. It has withstood the ultra-sonic vibration test and the 100C shock test. Only the Life-Time filter uses this exclusive cone design, it is fully protected by patents.

#### HOR YOUR CAR

Try the Lifetime filter on your car for 2 weeks: if it isn't all I say, you get your money back; if you keep it, you're through buying filter packs—the Lifetime filter is guaranteed for 10 years, actually will last many times that long.

For complete unit, including case (install on any car in 10 minutes), send make, year and model of your car and \$12.95 (we pay

shipping).

Conversion kit, which replaces your present filter pack with Life-Time bronze, is \$6.95 for most cars (send make and number of present filter when ordering). Conversion kits for Buicks with hydraulic lifters and for cars with full flow systems: \$13.95.

Or send only \$2 deposit, pay C.O.D. charges on arrival. But do it today—don't waste another cent on filter pack replacemental



Complete Lifetime



Lifetime Conversion kit, replaces ordinary packs with permanent bronze element.

Permanent Filter Division, Dept. FPS-12 CONTINENTAL MANUFACTURING CORP. Washington Blvd. at Motor Ave., Culver City, Calif. Ship Complete unit for
make, model, year of car
☐ conversion kit for
Name
Address
OttyState

#### FORD THUNDERBIRD

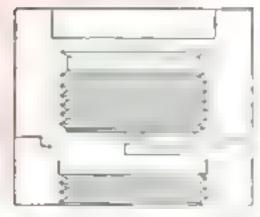
The New Personal Car with the Sports Car Flair Features the Spark Plugs in Your Future,

# NEW TURBO-ACTION CHAMPIONS!





Greater clearance in the firing end permits turbulent gases to keep the insulator free of barmful deposits. Heat range, the temperature zone in which apark pluga operate efficiently, in extended to the widest limits in automotive history to meet the requirements of new, high-output engines.



Exclusive tapered Turbo-Action sesting design forms a positive lock with a mating surface in the cylinder head without using a gasket. Correct installation is automatic and Turbo-Action Spark Pluga remain firmly fixed and accurately positioned in the combustion chamber.

The spark plug in your future is definitely the new Turbo-Action Champion which powers the mighty Ford Thunderbird.

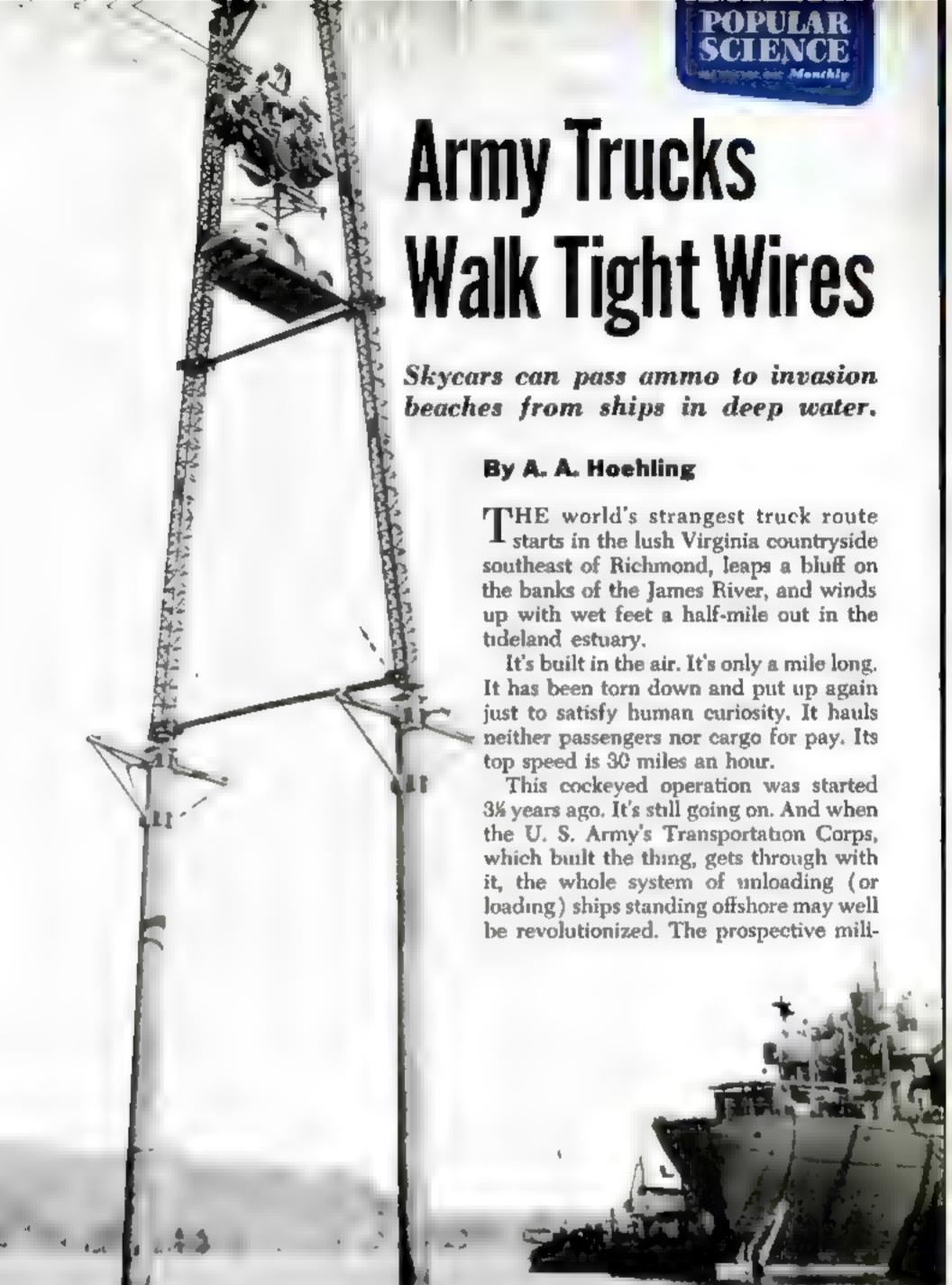
So superior is the performance of this new Champion in the very latest design, highoutput engines that other leading automobile manufacturers soon will follow the Thunderbird in adopting it as standard equipment.

Besides overcoming the number one problem of modern high-compression engines fouling at continual low-speed-driving-Turbo-Actions clear the way for higher compression, higher horsepower engines of the future.

Because of their new seating design and larger thread size, Turbo-Action Spark Plugs will fit only those new engines designed for them.

Your present car, however, will continue to give you top performance with regular standard Champions.

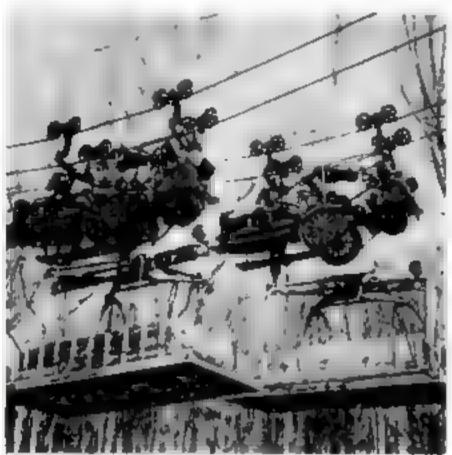
AVAILABLE AT FORD AND OTHER CHAMPION DEALERS



tary application is obvious: Set up in a few hours after invasion of a hostile beach, the tramway could speed guns, munitions and other heavy equipment ashore. Tides and rough water, bane of shallow-draft landing ships, would be of little hindrance to a cableway standing solidly spread-legged in the roiling water of the beach shelf.

Or it could temporarily replace some of the port facilities of a city with a waterfront badly damaged by wartime bombs.

A product of the corps' Transporta-



TWIN SKYCARS ride the suspension wires independently, can transfer up to 160 tons an hour from ship to shore. Each car weighs eight tons, is 18 feet long, 11 feet high, five feet wide.

tion Research and Development Command at Ft Eustis, Va., the acrial truck was built—the first time—in 1951 at Camp Wallace, Va.

#### Trucks Ride Topsy-Turey

It was the single-track type. Big overhead cables, supported by steel towers, provided the "track." On these cables were run skycars that could tote as much as 10 tons of cargo. The skycars were suspended from their roadway with their loads slung below them.

All kinds of cargo, from cases of food to big trucks, was plucked from barges or an LST moored in the estuary, swung high aloft, and trundled inland to a terminal depot. There, fork-lift trucks were used to remove it and store it away.

(Engineers are exploring the possibility of further streamlining at this point with a system of mechanical conveyors, to take cargo right off the skycars. Moving toward all parts of the depot, conveyors would speed up the sorting and storing of supplies.)

#### Engineers Double Up

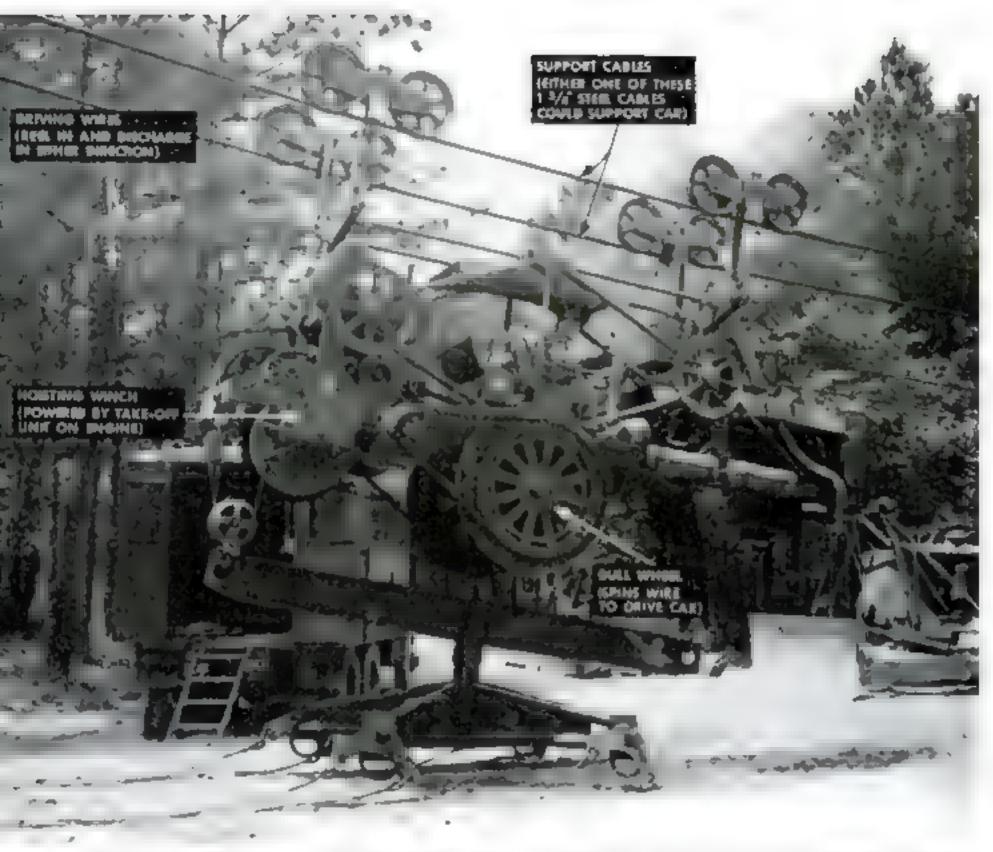
When human curiosity led to dismantling and rebuilding the trainway, it was for a good reason. The engineers in charge wanted to know how their truck route would go if double-tracked. It was simple arithmetic that it would handle twice the cargo. It did.

The testing is still going on, Meantime, the people in charge have whistled up a companion idea. Why not design a self-raising, artificial "sea-island terminal" that the skycars can land on to pick up cargo? Then cargo ships would be independent of the trucks' capacity, taking on cargo or discharging it at the sea-island terminal at will.

That's what they are going to try next.



MID-AIR VOYAGE, with cargo riding on slungunder platform measuring nine by 18 feet, takes eight minutes for a mile. The nine 75foot towers supporting the wire suspension ropes are anchored with guy cables. Safety devices include both air- and hand-brakes for car, a winch to raise and lower platform.



FOWER IS SUPPLIED by a 180-horsepower gasoline engine turning a torque converter. This is supplemented by a mechanical forward-andreverse transmission and speed-reduction gear Traction and propulsion are provided by two driving wires anchored at terminals beneath suspension wires. They loop completely around "bullwheels" at each side of car. As engine turns bullwheels, they propel car by reeling in wire and discharging it at rear. At land end, cars come to rest at ground level, as shown here, for service and refueling.

#### Firemen's Frolic: They Burn Down a Dynamite Factory

AFTER 20 years of guarding Du Pont's dynamite plant at Gibbstown, N. J., company firemen were ordered to burn it down. The picture at right shows them watching the result. A hundred and twenty-five old wooden buildings were left unused when a new plant was built elsewhere. They had to be burned because so much high explosive had been ground into the floors, walls and loading platforms that wrecking them for scrap lumber would have been much too dangerous.

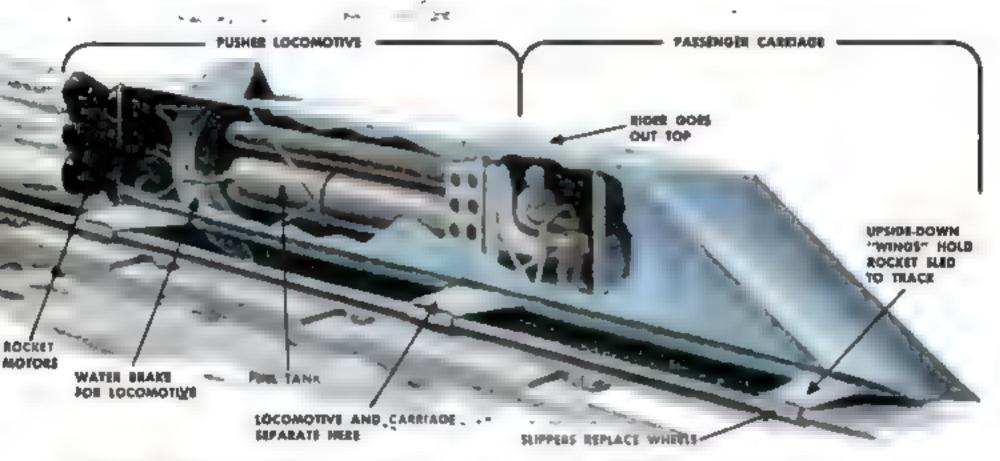


DECEMBER 1954



# Rocket Car to Hurl Man

First dummies, then human beings, will take a nightmare ride to find how to bail out of tomorrow's supersonic warplanes.



CONTROL-HOUSE OPERATOR (below), at periscope window, stands ready to throw lever that fires rockets, starting sled and rider on way. On roof are warning lights, siren, loudspeaker.

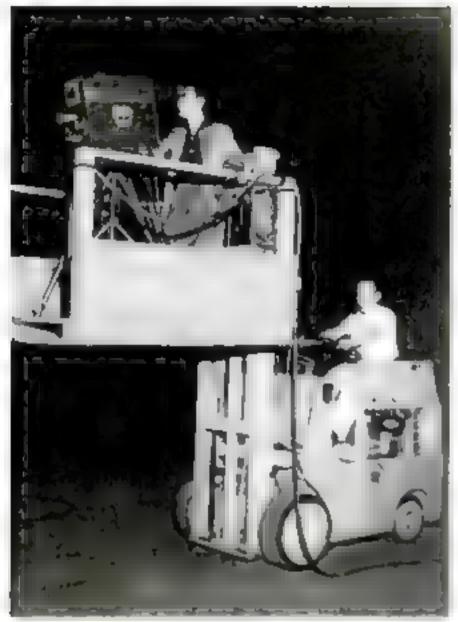
AT LAUNCHING PAD, start of 10,000-foot-rail straightaway to cliff's edge, two-section rocket sled is towed from underground fueling pit and maneuvered into position to make its run.



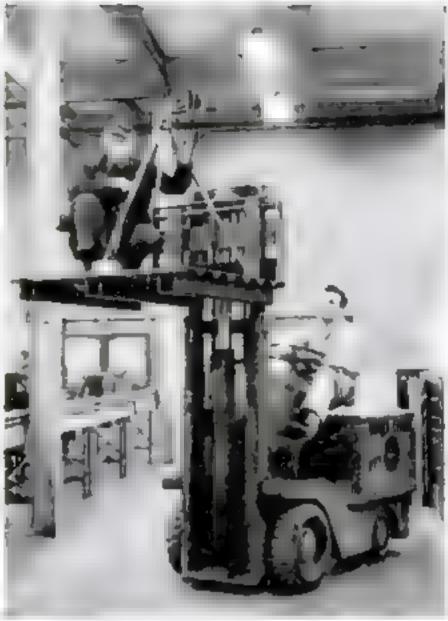


4 POPULAR SCIENCE





TELEVISION CAMERA rides truck to shoot Big Top Circus. Special platform rises 11 feet from ground level for bird's-eye view of performers and better close-ups of serial shots.



FACTORY LENSMAN squats seven feet up to photograph huge machinery. Able to move forward and backward, sideways, or up and down, the mobile perch cuts down shooting time.

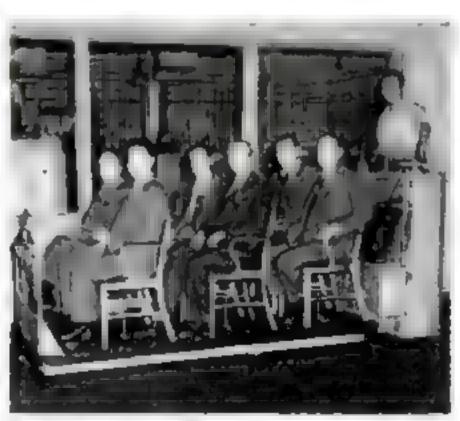
#### Fork-Lift Trucks Get New Jobs, Work Harder at Old

FORK-LIFT trucks-industry's mechanical pack mules-are busier than ever. They turn up at track meets to lift officials to measure and replace pole-vault crossbars and appear

at the Indianapolis Speedway to hoist cars for fast tire changes. Pictured are several engaged in other odd sidelines and one working harder at its own trade.



NO DRY RUNS with this truck. Instead of returning empty after a delivery, driver calls dispatcher on radiotelephone, then takes off in a beeline for a pickup.



ELECTRIC TRAIN takes visitors over the miles on an inspection tour of a new plant. Twelve fork-lift trucks, specially rigged for the job, stood by on opening day.

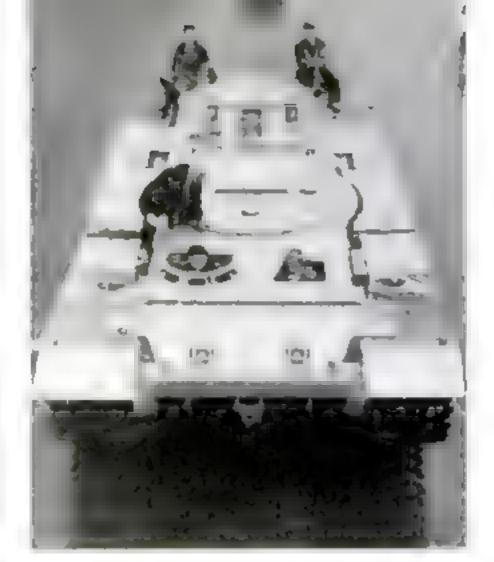
#### **British Try Out Turbo-Tank**

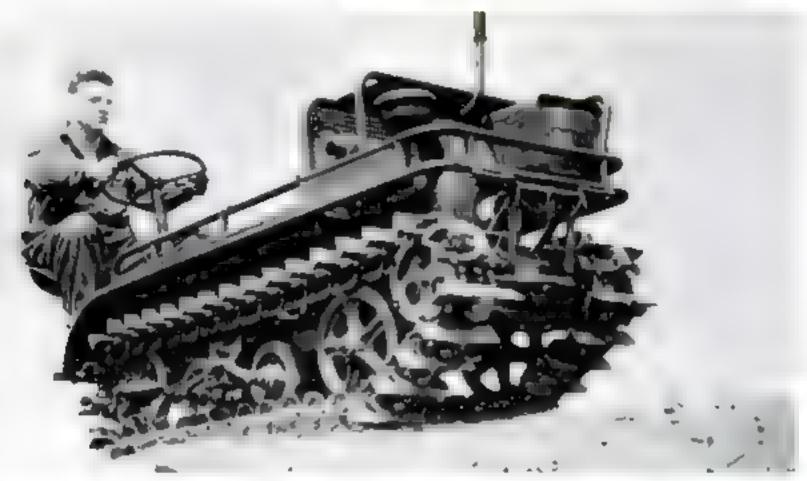
Visitions to a recent motor show in England got this peek (right) at what appears to be the world's first jet-powered tank. Officially, the British would say only that it is a "heavy tracked vehicle."

The power plant, made by the firm of C. A. Parsons, is a gas turbine with four combustion chambers, It can develop 1,000 horsepower.

#### Tractor Replaces the Sled Dog

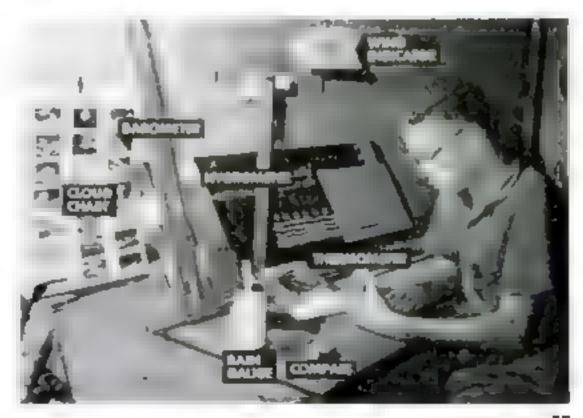
THE Army is taking one of the last bits of romance from Arctic life with this pint-size tractor (below), intended to replace the husky at hauling sleds. The Ordnance Corps' Mechanical Dog has a four-cylinder Crosley engine and will mush at 10 m.p.h. The driver can ride or walk near the front and steer with the vertical lever.

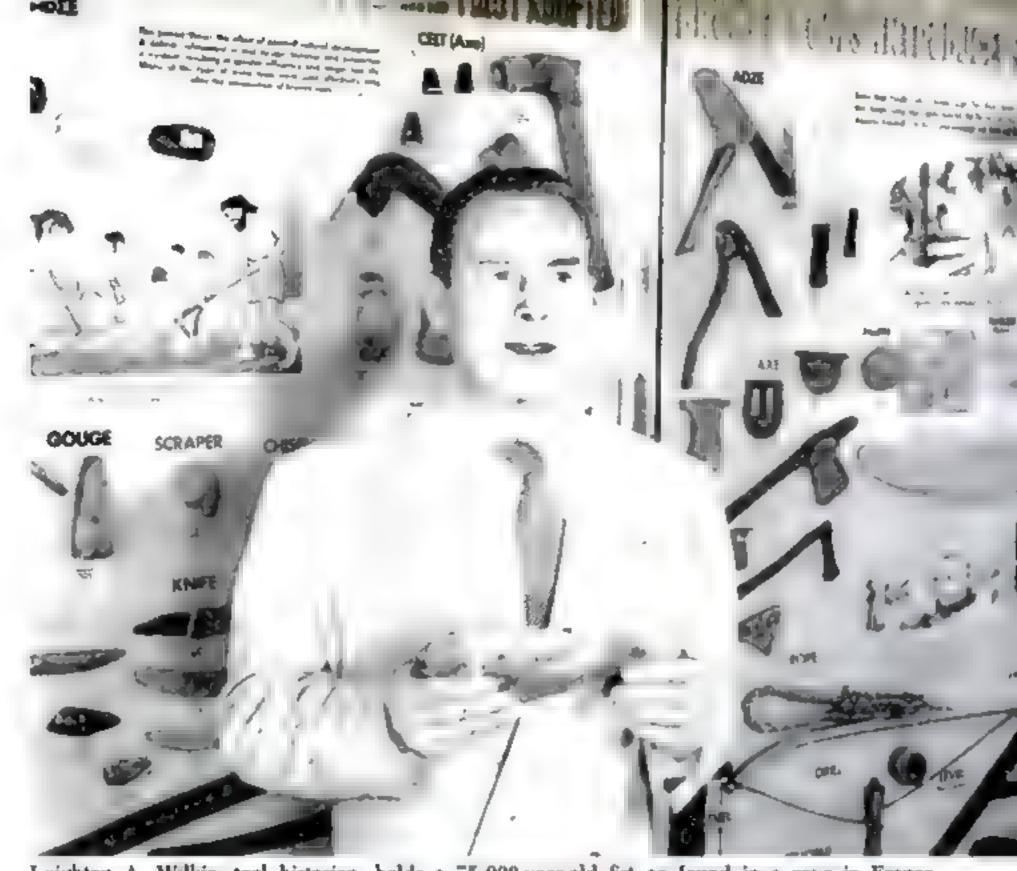




# Weather Station Built from Educational Kit

America's most famous corporations will help youngsters have fun with science and may attract more of them to professional careers. Five construction kits on weather (right), optics, electronics, geology and anatomy are available and more are being prepared in a program coordinated by American Industries, Inc., Merchandise Mart Plaza, Chicago 54.





Leighton A. Wilkie, tool historian, holds a 75,000-year-old fist ax found in a cave in France.

# The Toolmaker Who Put a Museum on Wheels

Inventing machine tools made him wealthy—but he couldn't duplicate a dawn-age fist ax.

#### By Don Weldon

ON A secluded stretch of beach near Santa Barbara, Calif., a bronzed, lithe man in his forties kneeled to brace a fint rock on a boulder, and with a concentration that set his mouth in a deter-

mined line and swelled the veins in his temples, assaulted the flint with carefully directed blows from a second one he had picked up on the sand. It splintered into several small pieces. He stared hard at the ruins of his handiwork and then tossed the remnants away.

"I spoiled another one," he sighed.

His young son looked up from the sand crabs be was collecting in a milk bottle. "Dad, you've been whacking stones together for two hours," he said. "If anyone saw you, they'd think you were nuts."

The man held his blistered hands thoughtfully before his eyes and rue-

fully shook his head.

"Michael," he announced, "your father is a failure as an ape man. If this were a million years ago, I couldn't for the life of me have made the most primitive kind of cutting tool—a fist ax. I've just proved that to myself."

#### Home Workshop-Cave-Man Style

Leighton A. Wilkie, a self-made machine-tool tycoon, did a lot of thinking about the evolution of tools as he drove his El Dorado convertible back to his lush estate in Montecito, where a fellow is considered a pauper if he has only one million. Although his paleolithic experiment had been dismally unsuccessful, he had gained a healthy respect for the imagination and the skill of the Pleistocene creature who invented and made the first rough stone tool-a rock with a purposely chipped cutting edge, which could be used for cutting, pounding, chopping, scraping, and grubbing. depending on how it was held in the hand.

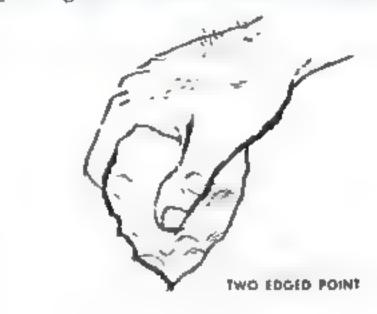
That ancient invention. Wilkie reflected, had become the foundation of nearly everything the human race has achieved Wilkie himself invented a metal-cutting bandsaw a mere 20 years ago. He is now the biggest manufacturer of bandsaws and saw bands in the world. He heads 47 corporations that make and distribute saws, surface grinders, gauge blocks and other DoALL products, in 46 countries.

#### Tools Made the Man

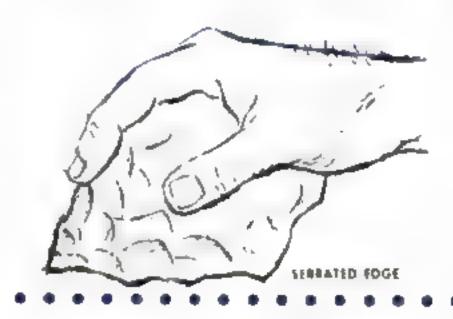
A man of wide and intense interests. Wilkie hurls himself into a new hobby as forcefully as he attacks a crisis in one of his factories. Soon after his day on the beach he was buying every new book on anthropology and archaeology that came out. He discovered that some experts attribute the development of the human brain from the ape brain to the constant use and improvement of hand

# 500,000 Years Ago...

ape men used these tools. Can you guess what each became?

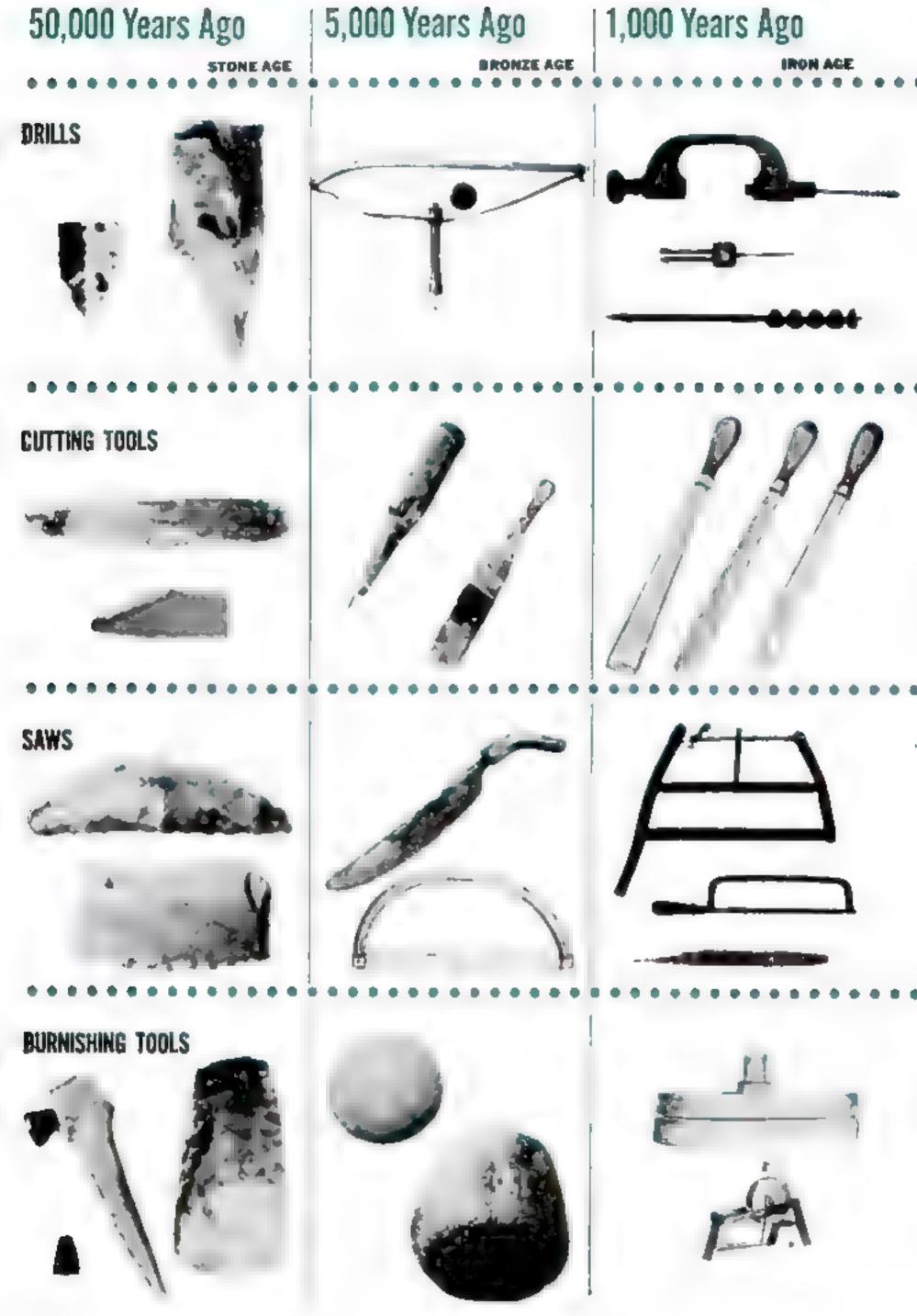








Turn the page to see how they developed into your shop tools.



SO POPULAR SCIENCE

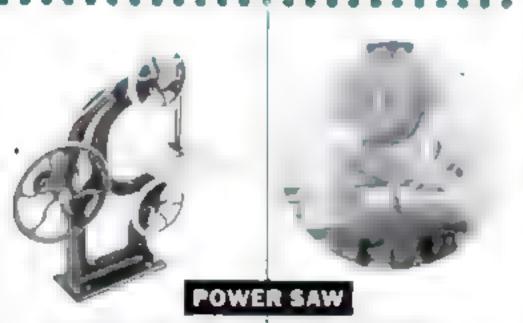
100 Years Ago

Today

**HOME-WORKSHOP ACE** 









tools-instead of the other way around.

He began haunting tool collections in museums, and was chagrined to find that nowhere in the world could one see a documented, chronological progression of the tools that have shaped our world, from the Stone Age to the present, Some of the museums had wonderful collections, however, of man's weapons.

#### He Accentuates the Positive

This raised Wilkie's dander. Why should the cunning ways that man has devised to erase himself be emphasized more in museums and written history than the creative devices that have made his lot happier? It was about time, he thought, for humanity to recognize constructive ingenuity as a more potent force than fiendish eleverness. So he built a new kind of museum.

It is portable, in 10 four-by-six-foot display panels, and it tells the story of "Civilization Through Tools" graphically with genuine artifacts, leased on a permanent basis from seven museums. This exhibit is now touring engineering colleges, trade schools, factories and industrial-equipment stores. The picture history of four familiar workshop tools, at left, is based on the traveling exhibit.

The panels enable you to trace man's developing tool sense step by step for a million years by walking around a room. Since the exhibits aren't under glass, you can inspect them closely and even touch an authentic "colith" more than half a million years old, the flint teeth of an 8,000-year-old sickle or a bronze saw in use when the pyramids were built.

#### Salute to the Past-at \$2,000 Each

The earliest machine tools, which brought about the Industrial Revolution, are represented by six working-scale models, made especially for the exhibit at a cost of about \$2,000 apiece from research and specifications furnished by the Science Museum of South Kensington, England, Seldom has an inventor taken such pains to salute others who paved the way for him.

Leighton Wilkie can do such things

as establishing a museum because he and his younger brothers, Robert J. and James W. Wilkie, have a \$50,000,000-avear business.

They not only have DoALL plants in Illinois, Minnesota and Canada, but also a national chain-store organization for machine-shop specialties and industrial cutting tools.

Their father had an automobile-repair shop in Winona, Minn., where Leighton started sweeping floors when he was 10

and helping as a mechanic when he was 12. By the time be was 16, the garage had acquired an autosales franchise, and the boy was selling cars between highschool classes. Both his car sales and school grades were somewhat curtailed, however, by the pal-

pitating concern that monopolized his attention-the enigma of how to make a million dollars. He'd go to the hbrary and drool as he thumbed through Who's

FOR HOPS BETWEEN SHOWS, panels trac-

ing the history of tools throughout the

ages are shelved like baker's pies in this

specially built Dodge truck.

Who in America.

#### At 18—On the Way to a Million

It was another year before he could afford to shell out \$80 for a shabby second-hand Saxon, but at 18 he produced a device to align connecting rods. The garage promptly became a machine shop, and in the next four years turned out 11,000 Wilkie Piston and Connecting Rod Aligning Machines at about \$50 apiece. With that start toward his coveted million, Leighton forgot about finishing his engineering and business courses at college, and set up a tool-anddie shop in Minneapolis.

In 1927 he invented a low-cost method of making short-run stampings that he licensed to 800 companies. This made contacts for the Wilkies in the business world that are still fruitful. For example, the Bausch and Lomb Optical Company used the process to tool up for their lightweight Zephyr binoculars, Today

the whole Bausch and Lomb industrial line is sold in DoALL stores.

Seeing a need for a better method of cutting out the dies made by his stamping process, Leighton Wilkie then adapted the principle of the lumber-mill bandsaw to a metal-cutting and filing machine. When he told his fiancée he had invented a new kind of bandsaw and was going to market it, she thought her husband-to-be was going to make their living by selling musical saws to hillbilly

bands. She married

him anyway.

saws, unfortunately,

Wilkie's contour saw filled such a crymg need in industry that 50.000 of them have been built by DoALL, from sturdy little \$450 models to a \$125,000 behemoth that handles six-ton dies. The first contour

wore out a blade before it had cut through 23 square inches of steel, By 1940, however, the company had developed a carbon-steel blade that would last for 300 square inches, and just last February it announced a new high-speed tool-steel blade that whizzes through 3,000 square inches.

#### Tolerances and Interchangeable Parts

Besides 50 types of contour and other saws and 300 variations of saw bands for cutting everything from stacks of garment patterns and magazine pages to glass and pork chops, the company makes a line of 12 surface grinders. This activity led to the manufacture of gauge blocks, which provide standards for measuring precision work accurately to millionths of an inch, and enable interchangeable parts to be fabricated in widely separated plants.

Fifteen years ago, Wilkie decided, "I can't run a factory when I'm right on top of it," and forthwith moved to El Paso, Tex., remaining there four years. He followed that with a year in southern New

[Continued on page 232]



#### **Car Part Makes Light Meter**

His workshop helped James G. Ogden III, University of Tennessee botany student, earn a master's degree. He made a light meter from a car back-up light, a photocetl and a neon tube. A count of neon flashes measures solar energy. At his feet is another meter with a built-in counter.



#### Index Guides Cart to Groceries

THE shopper twirling the cylinder on the cart above won't have to hike miles up and down aisles to search out a can of beans. The rotating directory tells just where every item is located in the store. The Brant Co., Marquette Rd., Johet, Ill., calls it the Supermarket Shopping Guide.



#### Toy-Train Parts Make a Hand

BLOWING into the plastic mouthpiece worn on the chest makes this electric hand open and close, so persons with paralyzed hands can grasp pencil, fork or even razor. Charles V. Gianno (above) of Lionel trains invented it, using toy-train parts. Lionel, 15 E. 26th St., NYC, will manufacture it.



#### Robert the Robot Walks, Talks

Newest toy for space-happy youngsters is Robert the Robot, a mechanical man who clunks about with lights flashing. He walks, he talks, he raises and lowers his arms and takes an iron grip on whatever is put into his plastic hands. The Ideal Toy Corp., 200 Fifth Ave., NYC, dreamed him up.



#### By Martin Mann

PEM PHOTOS BY W. W. MORRIS

YOU'RE getting new and better headlights for your car. They are brighter, but glare no more. They are far more effective in fog and snow, You'll be able to buy them next month, as replacement units, in all but a few states. By summer they will probably be standard equipment on new cars

These are the "modified sealed-beam head lamps," first real improvement in auto lights since sealed beams came in 15 years ago. Here's what they have:

- The high beam is brighter by 25 percent, You should get an extra hundred feet or so to pick up a stop sign. The pattern isn't changed much.
- The low beam is brighter, too—up 23

percent, with twice as much light where you need it most, down the right side of the road. You can see the worst hazard—a pedestrian in dark clothes—as much as 80 feet farther ahead. Because the increased light goes to the side and down, there is no increase in glare.

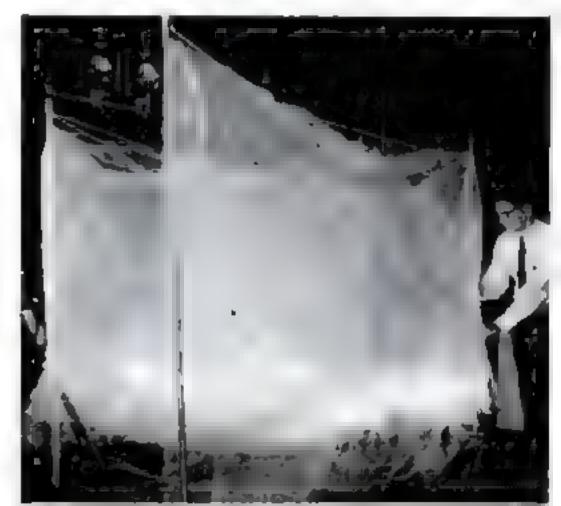
 The new low beam pierces fog almost as well as special fog lamps. It spills very little light upward, cutting out much of the blinding curtain of light that bounces back off fog, rain, snow or dust.

How did they do it? Designing a headlight that is brighter but not glarier sounds like inventing perpetual motion. Actually, the changes are few and rather simple:

 Both beams are brighter because the filaments take more juice—50 watts for high, 40 for low, instead of 45 and 35.

#### Tests in a cheesecloth fog show how lights work in bad weather

You can make fog in a laboratory, but it gets things awfully wet. So engineers use layers of cheesecloth (near photo at right) as a handy—and dry—substitute to demonstrate the efficiency of headlights in bad weather. How well the new lamps pass the cheesecloth test is graphically revealed in these pictures. The old lamps (center) fail to pick up the car standing behind the cloth fog. The new ones (far right) show it clearly. You can see why: The new lamps throw much less light upward, so less is reflected back into your eyes by particles of fog or rain.



94 POPULAR SCIENCE

Modified sealed beams for all cars, new and old, put more light on the road, less in the other guy's eyes.

# Driving Safer



The NEW This one is 17 percent brighter, but up-shining light is reduced by hooded filament, tilted reflector, new less (horizontal reflections are gone).

 There is now a little hood over the low-beam filament. This keeps light from shining up to blind you in fog and rain or to blind the other guy as he zooms by.

 The reflector is tilted down, also to cut up-shining light

 The lens is redesigned, partly to concentrate light on the right side of the road, partly to help stop light from shining up.

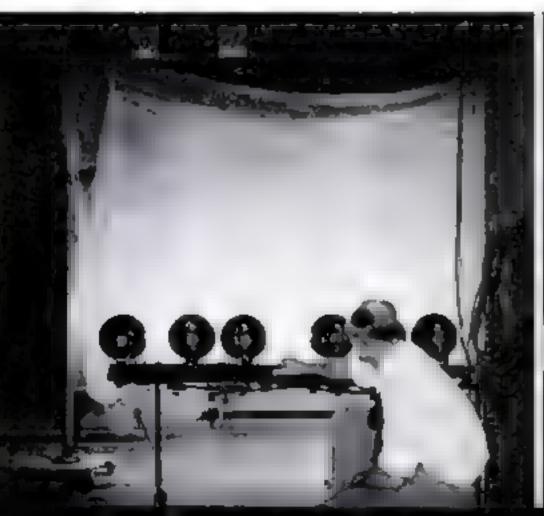
You'll notice the biggest reduction in glare close to the car, where it helps visibility most in bad weather. The engineers can't cut out all the glaring uplight—you need some to read a street sign once in a while. Some up-light is necessary, too, to avoid a distracting sharp cutoff at the top of the beam

The new lamps make aiming even more important than before. Improperly

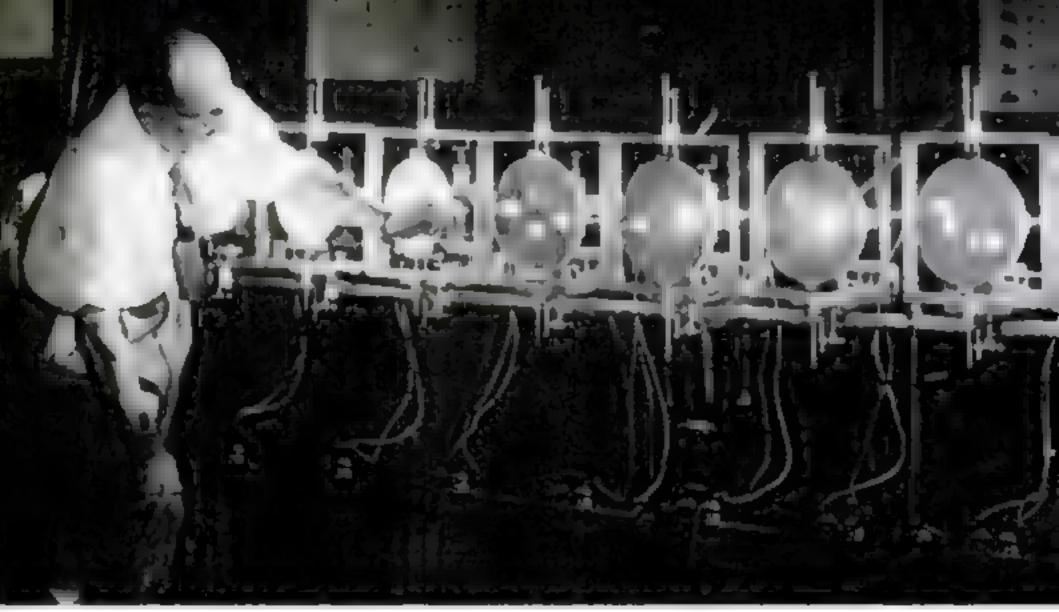
aimed, their extra light will be wasted or cause worse glare. (Many cars have built aimed headlights. As one engineer put it, the average driver can get more benefit from re-aiming his present lights than from slapping in a pair of the new ones without making sure they're aimed correctly.)

Because the new lamps are brighter, driving will call for extra attention to good manners. The high beam will blind you worse than ever when you come up against a jerk who's too lazy to hit the dunmer switch

Everybody gets in the act. The new headlight is an unusual example of industry-wide cooperation to give the entire public a better product. It will be standard on every car from Henry J to Cadillac. Every lamp manufacturer







BRIDGE OF LIGHTS shows how head-lamp lenses are designed by zones. At left, GE's auto-light-

ing expert, Val J. Roper, points to a cardboard shield used to develop new lamp. Shields, cut

is making it (and helped to develop it).

The only reason every car can't have the new lights right now is a legal technicality. Auto-light specifications are regulated by state law, and it takes time for state legislatures to change their laws. The few legal okays still needed should come quickly, since it was the state motor-vehicle administrators who made the request for the new head lamps in the first place. Car manufacturers will then make the improved lamps standard equipment. Meanwhile, they will go on sale in January as replacements in every state where the law permits.

Four-eyed cars coming? Separate lamps for the high and low beams could be the next development in headlights. General Electric and car manufacturers are already testing them, says Val J. Roper, GE automotive-lighting engineer who played a leading part in the perfection of the new standard lamp.

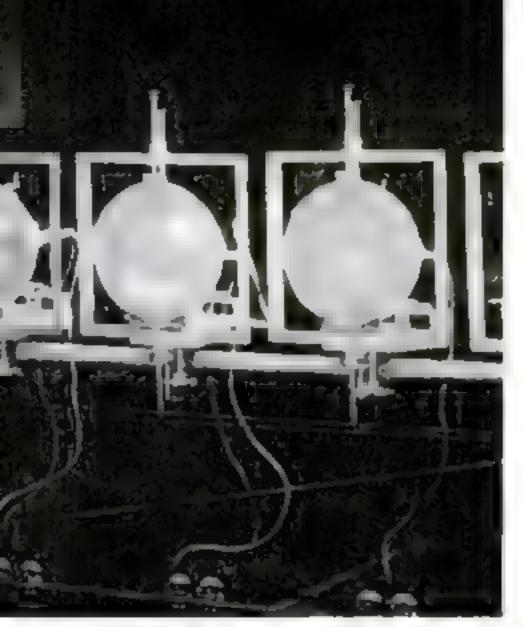
"Separate lights aren't only the engineers' idea," Roper told me recently in his Cleveland laboratory. "The stylists like them, to give car front ends a new look. They would have one advantage: With separate lamps we could design each

one to do its own job better. But the aiming problem, always a headache, would become just that much worse. And the state motor-vehicle administrators will object-they want a single standard lamp for simplicity."

How about those wonderful European headlights? Foreign-car aficionados have been raving for years over the excellence of lamps used on the Continent. Much brighter than ours, they claim, yet much less glare.

Comparative tests involving thousands of individual observations were made last summer at the GM proving ground. Detailed results won't be made public for a while, pending a high-level international conference that will try to hash out a uniform headlight standard for the

This much can be told now, however: The tests showed that the best of the European lamps (and they varied all over the lot) may be fine for European driving but wouldn't be so hot on U.S. 66. Their high beam is twice as bright as ours. This is helpful only on a straight, lightly traveled country road. It is wasted on curving highways, and with any



out to pass light from selected areas, let engineers study effect of changes in those zones.

amount of traffic requires dimming at too great a distance. Their low beam, American engineers think, is definitely inferior: practically no light directed up, where some is needed, and too much light thrown to the left, where less is needed

What ever happened to polarising? "It's a discouraging story," says GE's Roper. "Polarizing screens over lamps and windshields are the best theoretical answer. They, give you just what you want. Your car always has high beams, but opposing cars seem to use parking lights. They let everybody see far ahead, yet they blind nobody, if all cars are properly equipped

"Unfortunately, I doubt that I'll live long enough to find them on the road. Just too complicated and expensive. The special equipment and the hefty electrical system needed for the brighter lamps would add maybe a hundred dollars to the price of a new car.

"Considering the realities of the automobile business, these new sealed beams we're making do a right good job." END

NEXT MONTH: How to get the most from headlights by aiming them yourself.

DECEMBER 1954 97



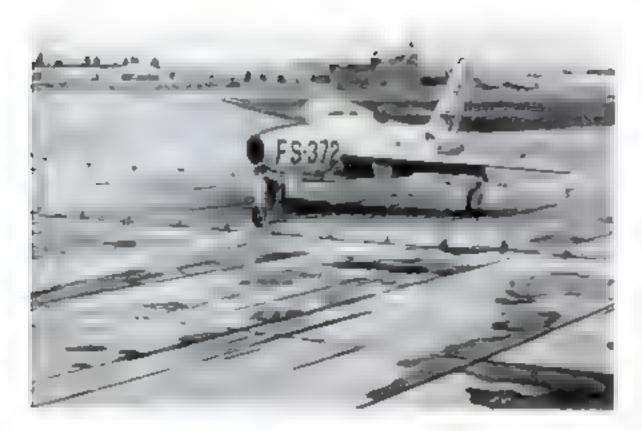
NEW LOW BEAM looks like this on the road—plenty of light on the right. Demonstration setup uses hig screen with a projected view of a typical road superimposed over headlight heam.



FOR PRECISE MEASUREMENT, lamp is set on adjustable mount while photocell (out of picture to left picks up light. Meter tells brightness for each angle lamp is turned to.

YOU CAN SEE THE HOOD (arrow) that shields the new low-beam filament in cutaway sample below. This is GE's version, called All-Weather. Other manufacturers' lamps may differ slightly.





#### Arresting Gear Turns Field into Flight Deck

ARRESTING gear, used to stop airplanes on Navy ear ners, has been installed on the runways of two Midwest urports for emergency use

Pictured at left is a "barrier" at Fairtax Airport, kan sas City Kai Its ends are attached to beavy chains. As a plane strikes the barrier, the chains drag it to a halt. At the Lambert-St. Louis Airport a cable across the runway is picked up by a tail book on the plane. Unwinding from a drain, it brings the plane to a halt



#### Red Tape Ties Down Helicopter

WHEN John Murray applied to the British authorities to test-fly his homemade helicopter, he got permission to take it 10 feet up—provided it remains tethered to the ground. Murray, a motor mechanic, put three years and about \$3,000 into the craft.



#### Tunnel Tests Six Ways at Once

LOAD, lift, drag, side force, pitch and roll are all checked simultaneously in this wind tunnel, which tests British de Havilland aircraft designs. The breezeway, nine feet high and seven wide, is made for low-speed winds: below 170 m.p h



#### Tractor-Towed Dolly Is 12-by-16-Foot Heliport

The water-hopping coptor above is about to land on a wheeled delly so it can be tower to its auport hangir for the night. The New York Port Yith mity has two such

float equipped whithoutds to ferry personnel between its 10 interstate bridges tunnels, terminals and imports. The craft hard on roettops amport strips or water.



# A Net to Catch the



NERVOUS NORSEMEN tried to explain the Northern Lights as glints from the Valkyries' gold-

en shields. Today's scientists are closer to the truth but still have many unanswered questions.

From observation posts stretching nearly from Pole to Pole, experts will soon act in global teamwork to probe auroras.

#### By Edward and Ruth Brecher

HAVE you ever gazed off toward the north on a clear spring or autumn evening and watched with awe and delight the brilliant display of ghostly, dancing light—sometimes white but often gaily tinted with red, yellow, green, blue or violet-known to the ancients as the Aurora Borealis and to most Americans

as the Northern Lights?

Like rainbows and eclipses, these rapidly shifting rays, bands, crowns, curtains, streamers and flames have long puzzled and inspired the imagination of mankind. They are visible about nine clear nights out of 10 in some parts of the far north; 25 nights a year in northern Maine; 10 nights a year along the belt between New York City and Portland, Oregon; and once or twice a year as far south as New Orleans.

Some auroras are visible over hundreds of thousands of square miles. The Great Aurora of February 4, 1872, brightened the heavens all the way from the Rock of Gibraltar to Bombay, India.

#### Mythology Gires II ay to Science

Mythology explained auroras as the reflections from the golden shields of Valkyries, the blonde warrior maidens who ride through the heavens escorting the souls of dead heroes to Valhalla. Later they were thought to be sunlight reflected from the vast polar ice fields. The newest theories turn out to be even more remarkable than the myth-makers' imaginings.

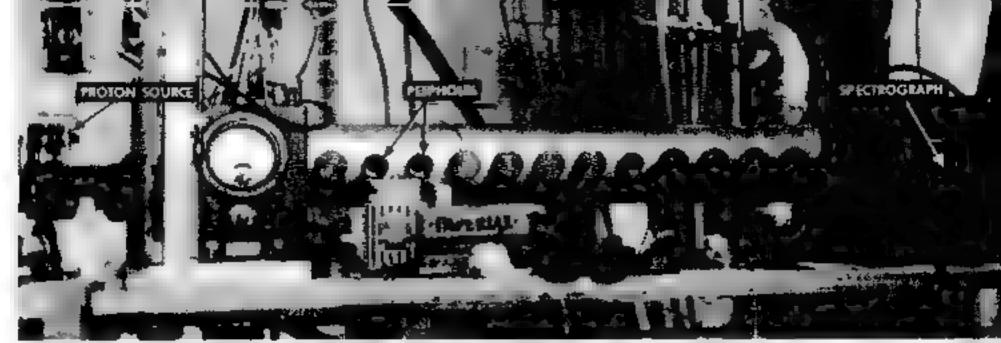
To confirm and expand the new auroral theories, scientists of more than 30 nations are currently planning a "net to catch the aurora"-a worldwide network



WISCONSIN SKIES glowed with a brilliant display of Aurora Borealis when this picture was made at Yerkes Observatory. The camera was aimed at reflections in a round, convex mirror.

of specially equipped auroral observation posts girdling the globe at various latitudes and extending almost from Pole to Pole. Researchers are confident that their network will capture important new facts about the earth, the atmosphere, the sun and the interplanetary spaces. Our Air Force particularly wants to know more, for it has found that the Aurora Borealis is a major stumbling block in preparations for defending the North American continent.

Scientists made important progress in understanding the aurora during the "First International Polar Year," back in 1882-83, when many nations sent expeditions into the Arctic. The facts collected by the numerous International Polar Year expeditions were pooled and studied, and scientists were able to report with assurance that auroras are not optical illusions but actual lights shining in the



AN IMITATION AURORA was created in this airtight tube by Univ. of Chicago's Dr. A. B. Meinel.

He pumped out most of the air to match upper atmosphere and then shot protons into it.

atmosphere from 60 to 600 miles above the surface of the earth. Auroras do not occur most frequently in the vicinity of the North Pole, they declared, but in a 300-mile-wide belt or zone which encircles the earth far south of the Pole. This "auroral zone" cuts across northern Alaska, then swings far south over the middle of Hudson's Bay, in Canada. Then it passes south of Greenland, over Iceland, just north of Tromsö in Norway, and on over the Arctic Ocean north of the Eurasian continent.

#### Auroras Are Studied at Thule Air Base

The center point which the auroral zone encircles is neither the North Pole nor the North Magnetic Pole toward which the compass points, but rather a spot in western Greenland, known as the "North Geomagnetic Pole." The American air base at Thule, Greenland, is close to this point and therefore a strategic center for auroral studies. A similar point in the Antarctic, the South Geomagnetic Pole, is also encircled by an auroral zone—the scene of the less-known Aurora Australis, or Southern Lights.

Nineteenth-century observers also made another discovery. Night after night and year after year they scanned the skies and recorded the auroras they

EXCLUSIVE COLOR PICTURES of how scientists launch rocket balloons, such as those that will be used to study the Northern Lights, are on pages 114-115.

.....................

saw. Simultaneously daytime observers were watching the sun through special filters and recording "sunspots"—great cyclonic storms stirred up on the white-hot face of the sun. The two sets of records showed that both sunspots and Temperate Zone auroras are much more frequent in some years than in others. The number of sunspots reaches a maximum every 11 years—in the years preceding the maximum frequency of auroras. (The next peak is predicted for 1957-58.)

Excited, the scientists then turned their attention to solar "flares." These are tremendous volcano-like eruptions of white-hot gases which rise like gaysers near active sunspots and shoot hundreds of thousands of miles into space. By careful study of solar flares and auroras, the scientists found that major auroras follow flares after an interval of at least 20 hours, and sometimes longer than that,

This time lapse proved that it could not be light from the sun that causes auroras: light, traveling 186,000 miles per second, takes only eight minutes to travel from sun to earth, not 20 hours. Something in addition to light must therefore be reaching us from the sunsomething which takes more than 20 hours to get here and which must accordingly be dawdling along at the comparatively slow speed of 1,000 miles per second or less. What is it?

Radio added the next significant facts. By the Second International Polar Year, 1932-33, air travel had opened up both the Arctic and Antarctic to scientific

expeditions. The Poles themselves were accessible. Radio made it possible for scientific outposts thousands of miles apart to study the same aurora from various angles simultaneously, and to exchange information about it from moment to moment—provided the radio waves didn't "black out"

Often short-wave radio circuits did fail, in both the Arctic and the Antarctic—and scientists noted with interest that the very hours during which auroras shone most brightly were the hours when short-wave radio was least reliable. It was during these periods, too, that magnetic compasses went haywire, and sometimes so much static electricity was built up in long-distance telegraph and telephone lines back home that communications were impeded.

#### Short Waves Bounce Back from Lights

In the 1930's, radio amateurs, or "hams," added the next significant fact to the growing body of auroral science. They experimented with very short radio waves—waves almost as short as those now used for television. Venturesome hams discovered that on certain nights they could get better results, no matter where they wanted to send their signals, if they aimed their antennas toward the north. The nights on which this northward maneuver was most successful were the nights on which auroras were shining most brightly. The radio waves were biterally bouncing back off the aurora

It is this tendency of short waves to bounce back from auroras that today has the U.S. and Canadian air forces worried. They are planning a plane-tight ring of radar stations around North America, to provide advance warnings of the approach of a plane from any direction, Radar sets aimed out over the Atlantic and Pacific work very well, but in the north radar waves may bounce back from the Aurora Borealis and show a confusion of signals on the radarscopes, Incoming planes from the Arctic can therefore penetrate far into central Canada. under certain circumstances, without being picked up on a radar screen. New

# This spectacular performance dazzled two hemispheres



OVER NEW YORK, as an artist for Leslie's Popular Magazine recorded it, the historic aurora of Aug. 28, 1859, visible throughout the U.S. and even in Havana, Cuba, looked like this.

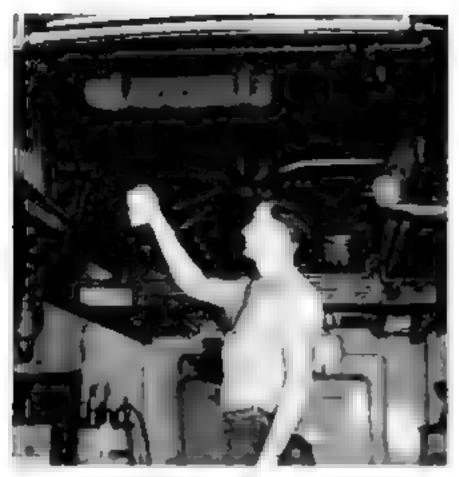


OVER MELBOURNE, Australia, on Sept. 2, 1859, four nights after the auctral show in the Northern Hemisphere, the Southern Lights performed in a manner both different and better.

types of radar may have solved this problem, for in September the Air Force announced plans for a new joint U.S.-Canadian radar net which will stretch across the continent far to the north of the auroral zone, Plane-to-ground and ground-to-ground communications are also impaired by auroras in northern Canada, and are likely to be even more seriously disrupted during the next auroral peak. In an effort to overcome these obstacles, both U.S. and Canadian defense agencies have been sponsoring auroral research.

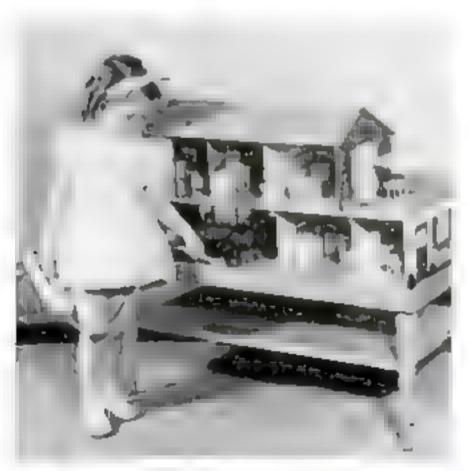
Meanwhile, the newer auroral observations have made possible a more complete theory of how auroras are produced. Among the most important contributions have been those made by Prof.

[Continued on page 238]



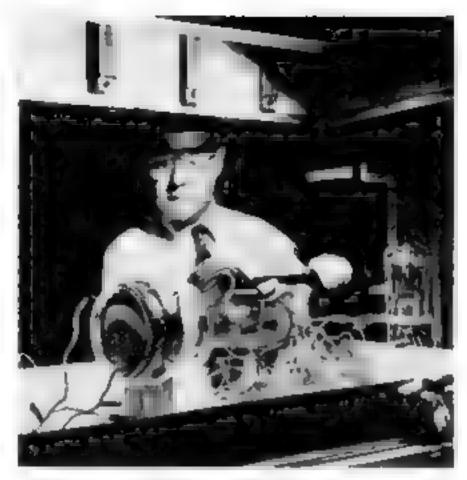
#### **Lubricant Sprays Away Squeaks**

A PUSH-BUTTON bomb of powdered graphite has joined the oilean and the grease gun at auto-supply stores. The workman above is spraying the dry lubricant on car springs. The DuPont photo shows a bomb made by Miracle Power Div., 1801 Spielbush St., Toledo, one of several companies making similar products.



#### Toy Cleaner Really Cleans

MOTHER's little helper knows she's helping with this toy vacuum cleaner. She can see the dust sucked up by the nozzle swirl through the plastic hose to the aluminum tank. With a shorter hose, the tiny vacuum is said to do a real job on car or furniture upholstery. Gay Toys, Inc., 6432 Cass Ave., Detroit, makes the Pla-Vac.



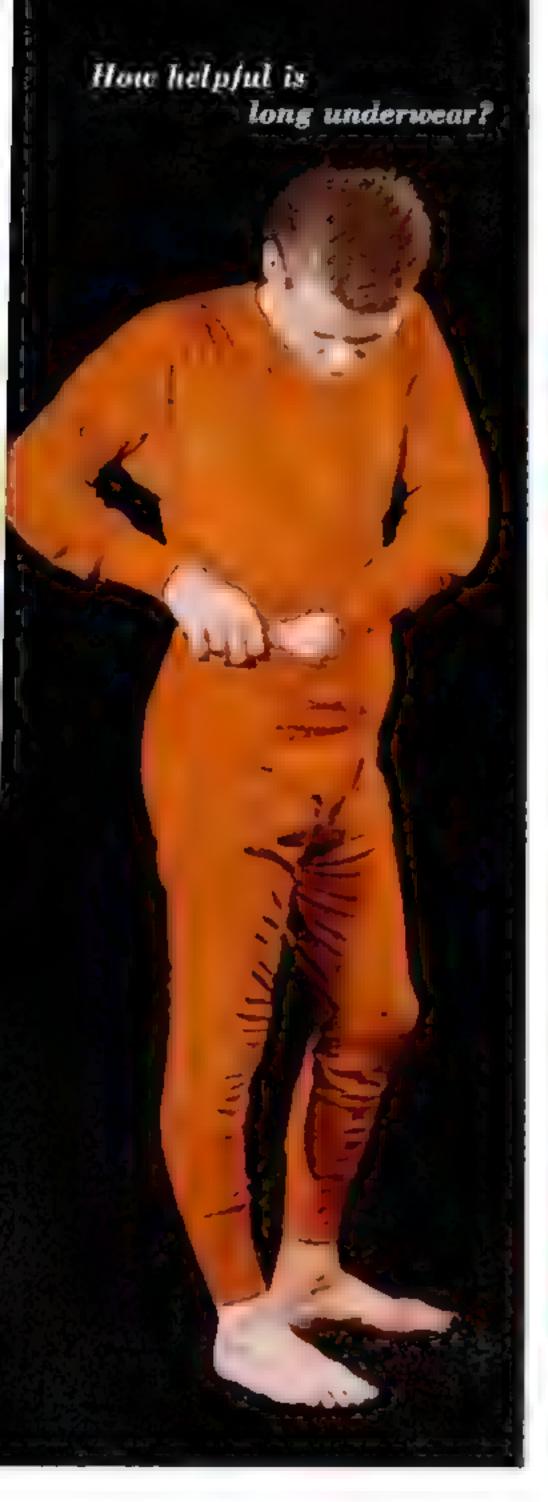
#### **Tube Holds Radar Pictures**

WITH this viewing tube, a radar operator in a plane or on a ship doesn't have to peer under a dim hooded screen to watch fleeting images. He can view radar displays in bright sunshine and even hold, or "store," a visible image for several minutes before erasing it. The tube was developed by RCA for the Signal Corps.



#### **Gambling Machines Put to Work**

NINETY-Two gambling machines are going to work in a plane factory—but not to put the bite on pay envelopes. Knocked down by workmen (above), the electronic parts will be used by engineers to further B-47 production. Boeing paid \$15 apiece for the confiscated pinball machines, expects to get \$100 worth of parts from each.



... That's one of 20 questions answered by a report on what the Army has learned about ...

# How to Keep Warm

#### By Ronald M. Deutsch

GREATCOATS and mufflers, galoshes and vitamin pills are coming to light again as Americans gird for their annual struggle with Old Man Winter. Will they help? Unfortunately, many of the most cherished beliefs about winter have no basis in fact!

This has been shown by 10 years of intensive Army research. While most of us have been heading for our firesides, a hardy crew of scientists has been exploring the frozen north. They are the men of the Army's Environmental Protection Division. From their work on the icy shores of Hudson Bay, on the bleak slopes of a New Hampshire mountain, and in laboratory cold chambers, have come findings that may keep you warmer and healthier this winter

Here are some tips for you, based on what is probably the biggest series of weather experiments ever attempted:

# Will "quick-energy" foods keep you warmer?

This is commonly believed, but Army studies show that if you eat regularly, there are no such things as "quick-energy" foods. Eating almost anything, however, will make you a little warmer, because the assimilation of food creates some body heat.

#### Will hot drinks and heavy loods help?



Hot foods and A drinks may make vou feel momentarily warmer, but they are of little value in the long run. You need food high in protein and calories to keep you warm. An ice-cream cone can help more than a cup of hot coffee.

#### Should you avoid "light" foods, such as salads?

A No, they have food values that you A need all year round, Basically, there is no reason to change your diet in winter.

#### Will liquor ease the cold?

Definitely not. Alcohol makes more A blood flow to your skin, carrying inner body heat with it. This makes you feel warmer, but you lose heat to the air. Even a small amount of alcohol will make you colder,

#### Should you take more vitamins in winter?

Many people think you should, but Army scientists do not agree. If you are eating a balanced diet and have no vitamin deficiency, you probably need no extra vitainins

The one exception to the rule is Vitamin D, which you get partly through sunlight. In winter you get less sun-But it is always a good idea to consult your doctor before taking vitamins.

#### Do people gain weight in winter?

Contrary to popular belief, the Army A finds that the body changes little in the cold. But increased appetite on frosty days, coupled with mactivity, may fool you into taking on more food than you need, thus adding an extra inch to your waistline.

#### Are you more likely to catch cold?

Army quartermaster researchers maintain that low temperatures have little to do with the common cold, except indirectly. Bad weather keeps you indoors more, in closer contact with others. where ventilation is poor. So it's easier to catch a virus from someone else. Stav out of crowded, badly ventilated rooms if you want to avoid colds.

Unless the cold weather is extreme. it isn't dangerous or even unhealthful. Army doctors believe chill is a minor

cause of respiratory illness.

#### is exercise tougher In the cold?

Exercise is actually easier in winter **A** than in summer because more blood goes to your muscles, although bulky clothing and poor footing make some work more strenuous. Snow-shoveling



can be very fatiguing, comparable in energy cost to mountain climbing. If your heart is too weak to permit you to climb a mountain, don't attempt to shovel snow.

But remember that exercise is one of your best means of creating body heat. Don't stand still in the cold.

# Are wet feet dangerous?

No, if they are warm, But with most footwear, moisture on your feet evaporates rapidly, resulting in extreme cold.

The Army's Quartermaster Corps has made extensive studies of the wet-foot conditions that lead to frostbite and trench foot. The severe cold, they found, is the prob-

lem—not the wet. So they developed the new "Thermos Bottle" boot, in which the feet perspire freely, but the perspiration

cannot evaporate.

When you're going to be out in the cold, you can easily reproduce the Army boot. Line a heavy sock with plastic, of the kind used to wrap frozen foods. Then wrap another layer of plastic outside the sock. Your feet will perspire, but you won't be chilled

# ls fit important in winter clothing?

A Yes. Good winter garments should fit well, but somewhat loosely. Loose clothing flaps enough when you are exercising to set up tiny air currents that carry off excess heat. This keeps you from sweating and then later chilling And when you stop working, the loose clothing traps layers of "dead" air around your body to seal in warmth

Especially in winter work or sports it is good to remember that even a tight belt can block air circulation. For skiing or skating, buy clothes with drawstrings at wrists and ankles. You can loosen the strings while you're exercising, then tighten them when you stop.

# Is cotton just as warm as wool?

Yes, it is. But the cotton must be as thick as the wool, Army studies show



that thickness is what makes the difference. Cotton, nylon and rayon can make good winter clothing. Fuzzy materials, such as fur or rough wool, have the added advantage of picking up more of the sun's heat.

# Is it wise to dress in heavy clothing?

A Not always, Strangely enough, your biggest danger in the cold is probably overheating. The perspiration you produce evaporates to make you cold. You can get thoroughly chilled while very heavily dressed.

Remember when you dress for winter that clothes can't make you warm. They can only keep body heat in and cold air out. Several thin layers of clothing

are better than one thick one.

### Should you go out without a hat?

A hats are not as important as gloves, but they make a difference. The Army reports that the main advantage of a hat is that it can be taken off easily when you start to overheat. Similar studies show that a scarf's biggest job is not to protect your neck. Actually it serves best to seal in heat from your back and chest. When you tie your scarf, make sure to fit it carefully underneath your coat collar, leaving no gaps for the warmth to escape.



## Can women take the cold better than men?

Yes, Women have some 75 percent more body fat than men on the average. This holds in considerable body heat. But while women and stout men are actually warmer, they feel colder, because the extra layer of fat keeps their inner heat from warming their skins.

Unfortunately. however, women's clothing styles lose them their natural advantage. Stockinged legs, representing 35 percent of a woman's skin surface cause her to lose heat rapidly. Army scientists shrug their shoulders at this problem. But they do recommend—wherever fashion permits—that women wear slacks or ski clothes.

## How helpful is long underwear?

Quartermaster researchers praise long underwear as being the boon that grandma always said it was, since it gives protection to most of the body. When taste and style allow, they suggest, women and men alike could profit from cotton underwear worn to the knee.

# Can dirty clothes keep you cold?

A Yes. Textile engineers have found that dirt mats cloth fibers and even breaks them, thus destroying the insulating value of clothing. Your overcoat will come back from a dry cleaning a much warmer garment.

Even more important than clean clothes are dry ones. Moisture in clothing evaporates, taking body heat with it. Also, wet clothing is a poor insulator.

# How much help are gloves?

A Probably more than you think, Your hands make up six percent of your entire body surface. Protect them with gloves and you'll stay warmer.

### How weak is winter sun?

A It is often just as potent as summer sunlight, the Arctic investigators report, Staying in the sun when you're out of doors can keep you several degrees warmer, a good thing to remember when you're watching late-season football games.

But keep out of the wind, Army volunteers exposed to the wind could not take nearly as much temperature drop as those protected from it. In the open, a windproof garment of light, tightly woven cotton will keep you warmer,

# Will your body protect itself from the cold?

A To a certain extent it will, But it is just this automatic protection that causes most of our unpleasant winter sensations. When your skin loses too much heat, a nervous reflex makes your muscles work spasmodically to produce body heat. This is, of course, shivering.

As the air gets frigid, your blood will leave your skin to protect your vital organs. Since your skin contains most of the nerves that feel coldness, you'll feel even colder. It is this that creates the sensation of numbness and makes people look "blue with cold."

A third natural response to cold is a tendency to hunch up. You bend over a little, pull your shoulders together and keep your arms close to your sides. This is simply your body's way of reducing the surface exposed to the air and slowing down its rate of heat loss.

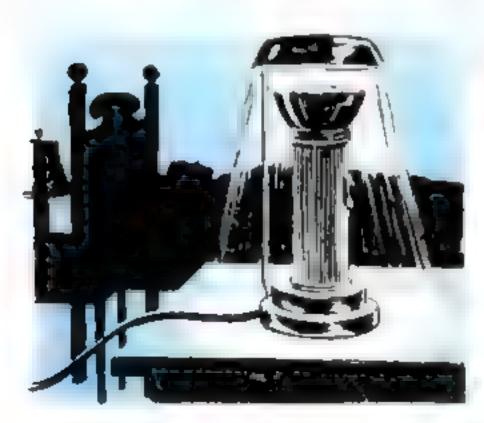
# Can you fall asleep in the cold and never wake up?

A Despite all the folklore on the subject, it isn't at all likely. If it did happen, the cause would be severe exhaustion and lack of food—not the cold, END



Clothes Dryer to Freshen Air. This GM-patented appliance would dry your laundry—or your laundry room. A conventional rotating drum would spin moisture out of wet clothing. Fans inside the sealed

cabinet would force damp air past a refrigerator-type evaporator coil, where water would condense and drain off. With drum disengaged, the device would circulate room air through the dehumidifying system.



2 Night Light to Double as Flash. This flashlight could burn all night, every night, without drawing its batteries. When plugged into its base, it would work off house current through a step-down transformer. But when you needed a portable lamp, you'd just lift it off its stand and use it like any battery-powered flashlight.



3 Sack to Clean Paintbrushes. A solvent-filled plastic bag would make paint-brush cleaning a clean-hands job. This inventor says that kneading the bristles and squeezing thinner between and around them gets a dirty brush clean in about 60 seconds. It would also take less solvent to clean brushes—and rollers—by this method

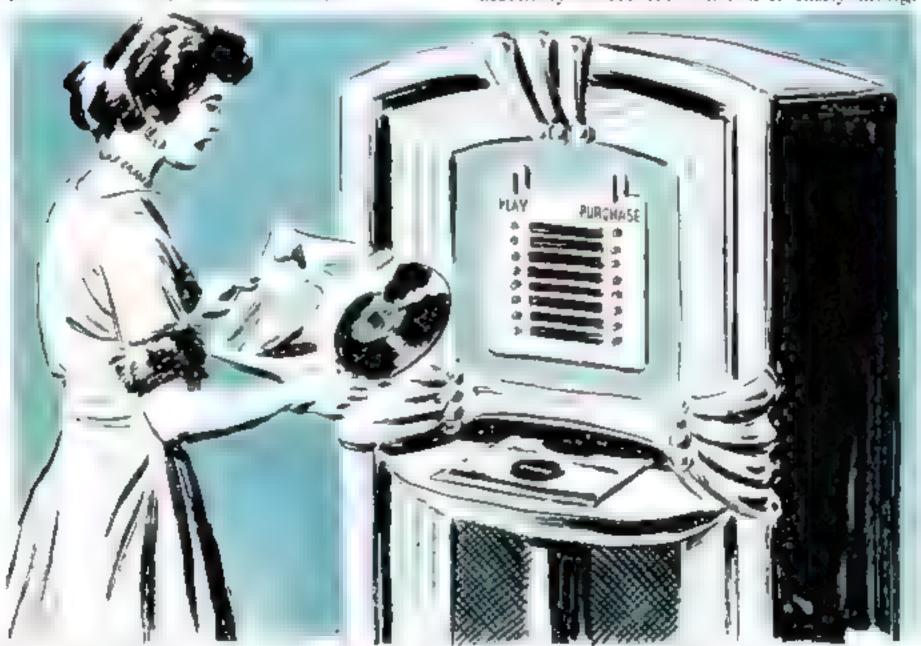
# MORE New Ideas from the Inventors



4 Shift Lock to Guard Car. A thief could short the ignition switch, but if your car were protected by this attachment he might have to make his getaway backwards. A collar that could be riveted or welded on any steering column would engage a detachable key-lock. When the lock was in place, the gearshift or automatic-transmission lever would be immobilized



5 Trash Can to Roll Easily. It would take less effort to move heavy trash or ashes in a can that had this roller base. Ball-bearing races would be enclosed between the can bottom and a flat footplate, so there'd be no danger of the can "creeping" or drifting down a slope. When you tilted the can, however, the free-wheeling assembly would let you roll it easily along.

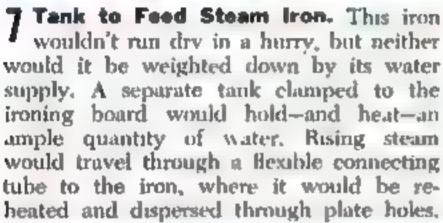


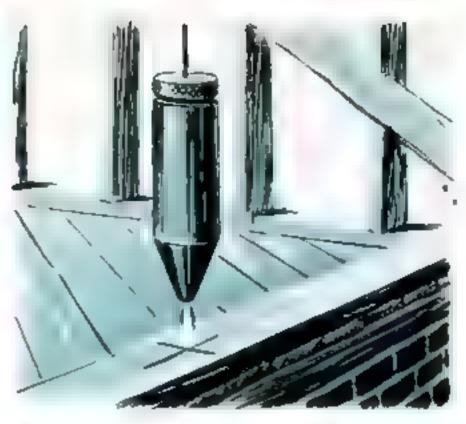
6 Juke Box to Sell Records. If you happened to like a record you heard on this juke box, you could deposit some extra coins and take a fresh copy out of the slot.

The amount you paid for playing the tune would be credited to the purchase price. Music stores might use the demonstration machine to speed and simplify sales.

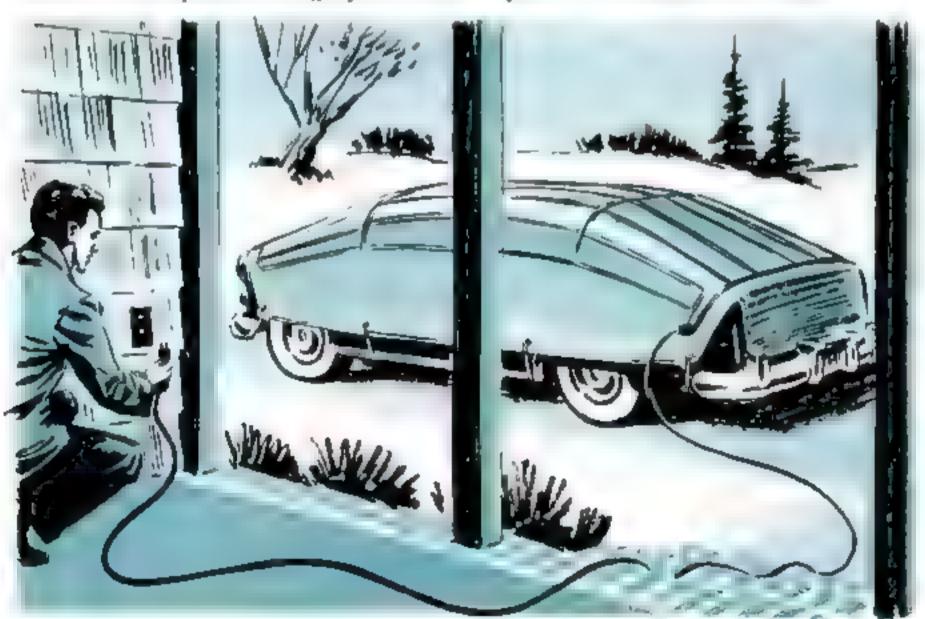
L S patents on these inventions have been granted to 1 R K Shemman Davian Ohing 2 R. L. Levinson, NYC and I, Korshin Codorhurst N Y , 3, H W Hottle Logicable & 1 W R Hildebrand Kansas Fits, Was, 5, P Leviten, Fair Logical







Plumb Bob to Light Up. By pinpointing a beam of light exactly on center, this bob would help a workman sight a plumbed line faster and mark it more accurately. The illuminated plumb bob would resemble a pocket flashlight, but would be precision-made for exact alignment and weight distribution. A lens and a focusing aperture would direct the beam.



Gover to Shield and Warm Car. An electric auto blanket designed as a portable garage would protect a car's body from winter weather, keep the engine from

freezing, and save you the discomfort of starting up a four-wheeled icebox on a cold morning. The cover would unwind from a spring roller clipped into bumper brackets.

N I ; O. L. J. Andres, Chicago, ". L. Keichald, Simshare, Cana.; R. E. Uitchell, San Dergo Calif.; 9. E. J. Patrice, Albumber, Calif.

# New Look for Churches: Modern Design Takes Over

Master architects apply their skill to houses of worship with striking and beautiful results.

ONE out of every four churches being built in the U.S. today doesn't look the least bit like a church. It has a strange, new architectural beauty and an undentably inspirational look, but the traditional slender white spires and Gothic arches have disappeared. In their places rise sharply angled or sweepingly curved modernistic structures of concrete, glass and steel.

Four outstanding examples from the Midwest are shown here, but the new look in churches can be seen in all parts of the land. Architecturally conservative New England will soon shake off orthodoxy with a cylindrical chapel.



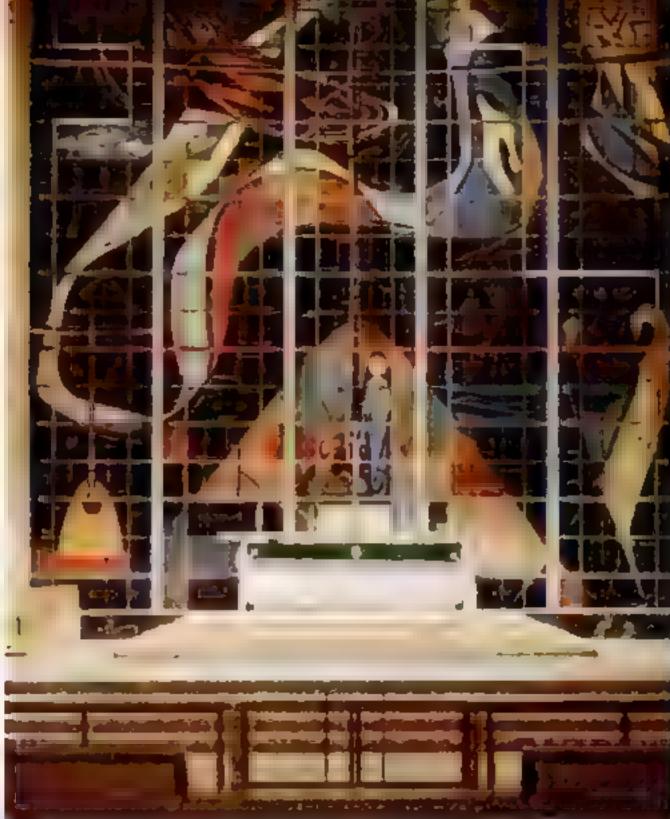
ONE GREAT, SOARING CURVE roots the sanctuary cabove left of a synagogue designed for Congregation Buai Amoona St. Louis, by the late Eric Mendels dan A sweep of recessed windows above right floods the ark, focus of the devotional service with afternoon light Hugo curved steel beams support the church.



er, the completely open front of the chapel at left faces the campus of Illinois Institute of Technology in Chicago. Architect Mies van der Rohe used an extremely simple design and common materials—the roof is made of prefabricated concrete panels—to achieve inspiring beauty for his building on a limited budget.

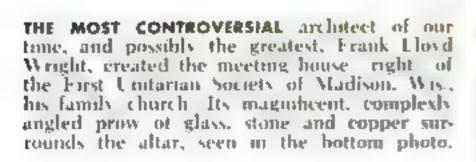
112 POPULAR SCIENCE







STAINED-GLASS WINDOW—twentieth-centurystyle—dominates St. Ann's Catholic chorch designed by Joseph D. Murphy, in Normandy, Mo. The window by Enul Frei and Robert Harmon actually contains many opaque panes of painted wood so that changes in lighting after the pictures. At left below, the outside









1 FOLDED BALLOON is unpacked. The 110-footlong ribbon of plastic is laid out on the deck of the U.S. Navy icebreaker Atka.

2 HELIUM IS VALVED IN through a narrow red inflation tube. The balloon's plastic head fills out and rises slowly from the deck.

# **These Balloons Launch Rockets**

ATOMIC particles that hurtle into our atmosphere may help scientists learn more about nuclear energy. What they learn may affect space travel, war and countless other things.

One way to study them is to send instruments into the no-man's area almost 70 miles above us in rockets launched from balloons. These striking photos show how that neat trick is done.

3 STRAINING BALLOON gulps the last of 34 tanks of helium. Project Skyhook is spon-

sored jointly by the Office of Naval Research and the U.S. Atomic Energy Commission.





4 INFLATION is nearly completed. When the balloon reaches its 70,000-foot rocket-firing altitude, it will be 68 feet in diameter.



5 LIFTING POWER of the balloon is tested. It has to raise weight bags that are 50 pounds heavier than the 220-pound Deacon rocket.



6 ROCKET IS HOOKED onto the balloon at the end of a 100-foot nylon line. Scientists give it a helping heave over the side.



ROCKOON COMBINATION climbs skyward at about 1 000 feet a minute. Bocket mechanism will kick missile, packed with instruments, 350 000 feet into ionosphere. A tiny radio transmitter sends scientific data back to the ship.





CHRYSLER Long, sleek lines have been burrowed in part from the company's idea' cars. It is two inches lower than last year's models. For more details see page 1.55.

BUICK Outside changes include new grille and tail lights. Under the hood, more power and a variable patch transmission for faster passing. For the full story see page 129



## The Ford-Plymouth-Chevrolet Story

Playing for keeps, the Big Three go after your trade with such lures as hot performance, luxury and a low, low look.

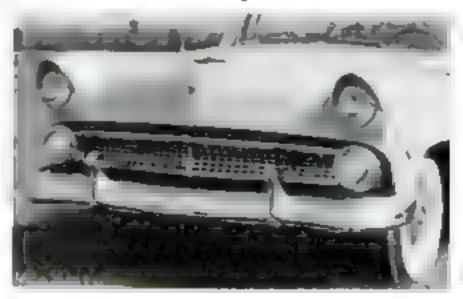
#### By Frank Rowsome Jr.

AUTOMOBILES, like women, are acquired for a variety of motives, such as beauty, utility, reasonable maintenance, lively response, and special features. Arming for 1955's crucial Big Three market, each maker has spent many millions in shaping a vehicle that combines the strongest lures. So it isn't surprising that the new Ford, Plymouth and Chevrolet have a lot in common—as well as some fascinating differences. The parallels first

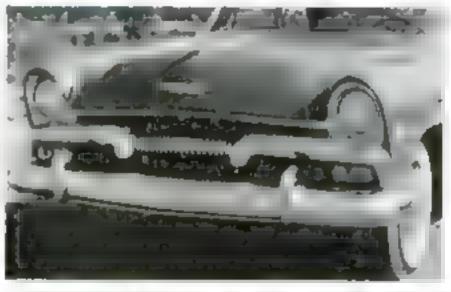
• Each has a whopping overhead-valve V-8 that delivers more power than most Packards, Cadillacs or Lincolns just a few years back. Each also offers optional extra-power combinations that boost output to still loftier levels around 180 hp. (To sales departments, there's only one answer to the headachy question of how much power is enough: At least as much as the competition has.) To copper the bet, each maker also offers faithful sixes of relatively modest power—down around what you got in the heavy quality cars of 1946.

• Each has pulled out all stops in prettying up its cars—wrapped windshields, hooded headlights, multihued paint jobs, jewel-styled hardware, drawing-room upholstery. "We're building bouldoirs on wheels," comments a ranking engineer morosely. "On some jobs, the trim costs more than the engine"

 Each has been redesigned to be a little lower, and to look a lot lower. Lowness and length are believed to bring out the



FORD This fancy, four-eyed beast is a direct descendant of the flavyer.



PLYMOUTH Do you think old maids will keep buying them?



CHEVROLET

Touches are lifted from Cad, Olds, even Ferrari.

FORD The top of the line, and slinkiest, is the Fairlane Crown Victoria below. A shiny metal strip bisects the top: you can get the front half in green plastic. At right is the middle-line two-door.





checkbook, according to Detroit thinkers who cite the sales troubles of parkable and garage-fitting, but dowdy, cars.

• Each would love to sell you the works in the gadget department: power-assisted brakes and steering, no-shift or overdrive transmissions, push-button windows and front seats, and windshield squirters. Plymouth and Chevrolet have air conditioning, and Ford doubtless will by warm weather. Each provides tubeless tires as regular equipment, though Plymouth tags them as "optional at no extra cost."

• Each uses, underneath the sheet metal, basically similar suspensions and drives—coil springs in front, leaf springs in back, and Hotchkiss drive. (All three bave had to cope with the problem of rear-spring distortion under the torque of the muscular new engines.) Each has modified its chassis and shaved a bit off minimum ground clearance. Each uses suspended brake and clutch pedals.

The differences. These seem more meaningful, if only because they relieve a person from thinking it is an eenymeeny choice. (Some of the following spees may yet change; they were pried out nine weeks before Ford's and Plymouth's announcements, in a year when each decimal place is competitive.)

Ford engines. The V-8 is essentially similar to '54's—with the major difference that it has grown 33 cubic inches to a big 272. (The bore is up from 3.5 to 3.62 inches, and the stroke from 3.1 to 3.3) This boost costs almost no weight penalty: the block runs within half a pound of last year's.

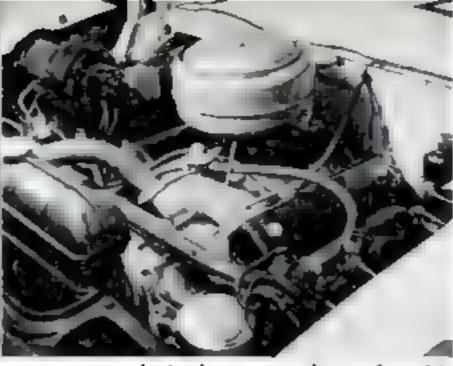
Compression has been raised to 7.6:1, although the engine runs on the same regular fuel that the 1954 job did at 7.2, thanks to some "mechanical octanes"—touch-up improvements in combustion-chamber shape, better valve cooling and new antifouling spark plugs. There is also a new camshaft, calculated to improve low- and medium-speed torque, which pulls 2½ inches more vacuum at idle than its predecessor.

The six-cylinder engine has chiefly touch-up changes, notably a boost to 7.5 compression.

For the customer who wants power to burn, Ford provides an optional "power package" consisting of a four-barrel carburetor in place of the regular two-barrel one, with intake manifold to match; a modified distributor and special radiator; and special 8.5.1 cylinder heads, which of course call for premium fuel. This rig is available only on automatic-transmission



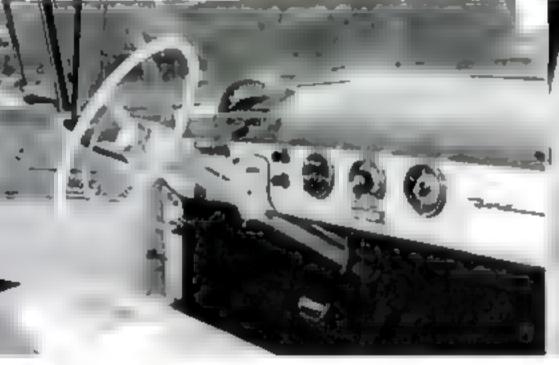
BORROWED FROM THUNDERSIRD are many styling touches, including rear-quarter and tail-light shapes. A pair of back-up lights can go over red lenses. Twin tailpipes end under the bumper.



THE INCHES don't show at a glance, but this Ford has bigger displacement than '54 Mercury, Buick Special or Chrysler Windsor. In hopped-up car, air cleaner resembles that on page 127.

CIRCLES are new dash theme: from left, they are ventilating system, radio and clock. Range indicator for automatic gearbox lights up and is built into panel just over steering column.

ONCE YOU GET IN, which takes some bending, the hardtop is luxurious. Textured plastic upholstery, foam rubber, and gee-whiz color combinations have all got their hooks out for you.





cars in the Fairlane series, which displaces the Crestline. Dual exhausts are standard on this line, whether or not you buy the package. Ford is staying with solid valve lifters and, except for the hopped-up cars, manual chokes.

Reported powers are 120 hp, for the six, 162 hp, for the V-8 and 182 for the goosed-up version.

Plymouth engines. Here the setup is a bit different. At the bottom of the heap is the familiar L-head six, moderately vitamin-fed for 1955, Its compression is raised a hair to 7.4; the already-long stroke is stretched out a quarter-inch to 4.63; and the displacement and power go up to 230 cubic inches and 117 hp.

The V-8 engines come in two displacements (241 and 259 cubic inches) and,

by dint of an optional four-barrel carb on the larger one, three horsepowers: 157, 167, and 177. Plymouth's guiding notion here is to provide something for everyone, like shoe or hat sizes, Compression ratio is 7.6.1.

Though the engines show kinship to the Dodge V-8, there are interesting differences. They're going to call the combustion chamber a "polysphere," because the exhaust-valve seat is located in a "polygonal section of a spherical surface." (Try visualizing that the next time you have insomnia,) The valves are paired side by side, transverse to the engine, unlike Ford and Chevvy, where they run fore-and-aft. Unlike past Chrysler-built engines, valves are worked off a single rocker shaft, which saves weight (and

PLYMOUTH The hardtop below and convertible at right are both Belvederes, showpieces of the wholly restyled new line-up. Headlights and grille may suggest Mere, tail lights new Buick.





cost). This also permits a smaller cylinder-head cover that doesn't mask the plugs. These stick out *above* the exhaust manifold, giving an accessibility that will please Saturday-morning mechanics. The engines have automatic chokes and, except on the six, hydraulic lifters.

Cherrolet engines. A customer can get six different power packages for '55, but they boil down to two blocks with varying combinations of cam, carb, gear-box and rear axle.

Like last year's, the sixes are 235-inch OHV jobs, running at 7.5:1 compression. They differ from each other chiefly in the camshaft. This year, Chevrolet's dynamometers rate them at 123 and 136 horsepower. The lower rating goes with three-speed or overdrive boxes, the latter with automatic. To fit the lowered hood line, both sixes have a redesigned air cleaner and a relocated, slower fan

The basic V-8 is wholly new. It is also short, light and sassy. The block itself is not quite 22 inches long, and the complete engine weighs about 30 pounds less than the less-powerful six. It has a 265-inch displacement, 8:1 compression, and a rating of 162 horsepower at 4 400 revs. The bore is a husky 3.75 inches, the stroke a shortest-yet three inches.

Chevvy's valve train is interesting. As in the new Pontiac, there are no rocker shafts at all. Each push rod and its accompanying valve stem nose against a little steel clamshell. This pivots on a central stud, acting as a combined rocker arm and shaft. According to Chevrolet people, the arrangement works durably and well. They've run test engines for hours at a screaming 5,200-r.p.m. overspeed without valve float.

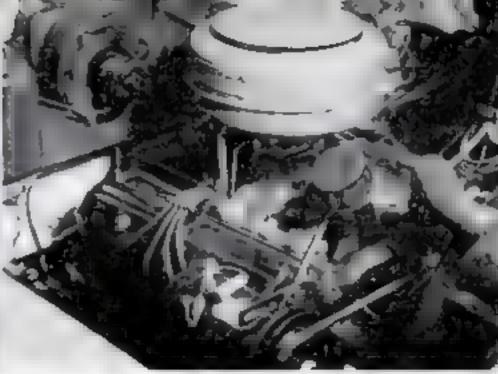
For all-get-out characters, Chevvy's hottest package combines a four-barrel carburetor and dual exhausts. Available with any transmission, this job is rated at 180 horsepower at 4.600 r.p.m.

Dimensions. With substantial body and chassis changes for Ford, and drastic ones for Plymouth and Chevrolet, almost all major measurements are different this year:

	Ford I	lymouth Chevrolet	
Wheelbase	115.5	115	115
Over-all Len	198.5 -	203.8	195 6
Londed Heip			
Sedan	61	60.1	60 5
Hardtop	59	59.3	59.1



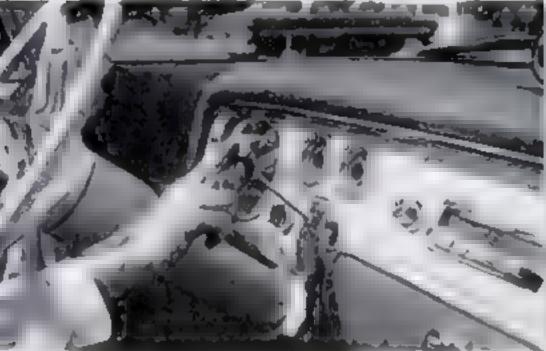
LOW ENOUGH to be tripped over in the dark, Plymouth has enough clearance for normal going. Gas filler is in right fender, so its pipe uses space behind spare that is usually wasted.

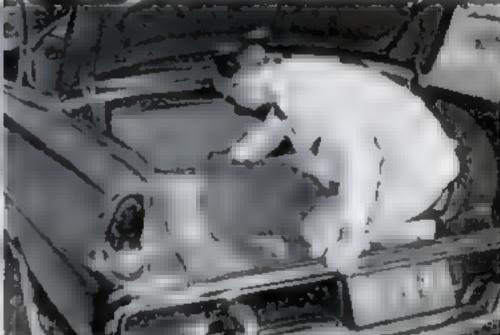


NEW V-# has good accessibility, with plugs above exhaust and no ventilating ducts by fenders. Iding engine still folly languorously on its rubber mounts the way the old one did.

MONREFLECTING TEXTURE is sprayed on shrouding over instruments. Dash selector is gated for no-linky operation. Chrysler's new coaxial power-steering system is a Plymouth option.

PLENTY OF SPACE, for odd shapes, is available in the trunk. Part of the 33.5 cubic feet is in a valley ahead of the aste homp. It may collect odds and ends like the folds of a sofa-





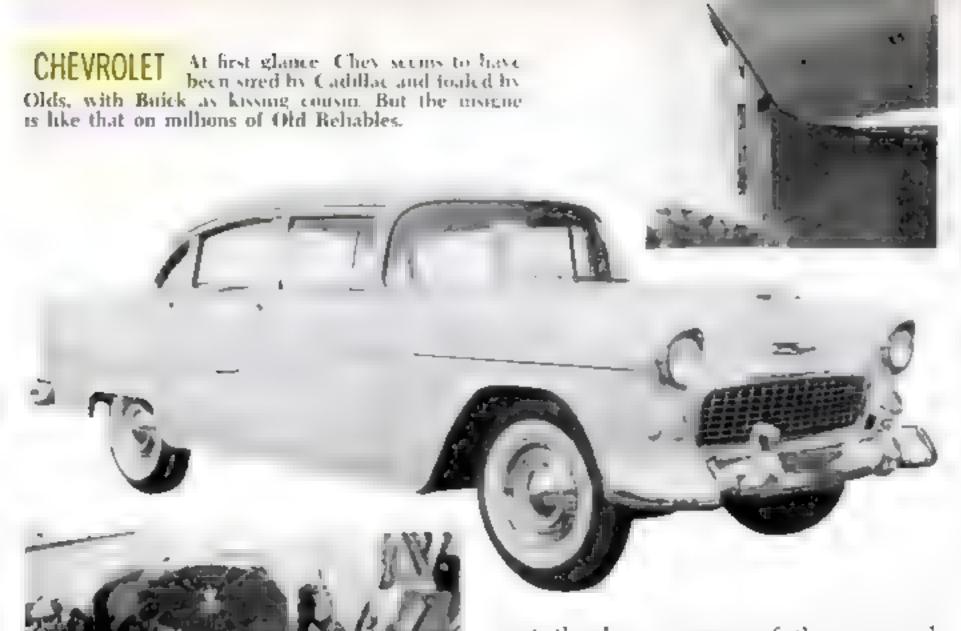
•	Ford	Plymouth	Chevrole
Ground Cl	earance 6.6	5.6	6.5
Front Head	lroom in	Sedan	
	35.1	34.9	35.7

Bottoming on a rutted back road is going to come easier in the future, since ground clearances have all been pared. (The figures above are for hardtops; sedans and wagons will have up to an inch more.) Tightest of all is apparently the Plymouth convertible, where with five passengers aboard, a frame X member comes 44 inches above the ground.

When the cars do run aground, Ford looks to be best off—the frame side rails are low points. The company had a spe-

cial engineering program smoothing off protuberances and tucking up vulnerable bits. On Chevrolet a section of the exhaust pipe is lowest, but just above that, as with Plymouth, the vulnerable oil pan might catch the blows. Automatic-transmission Chevvies also have two oil lines running to and from the heat exchanger that look to be fairly snaggable.

Compared to '54, Plymouth has of course changed most drastically. It has gone from a stubby vehicle in which you could wear an Abe Lincoln hat to the longest, and, in respect to headroom, the lowest of the three, Its over-all length is up by a fat 10.3 inches. Of this stretchout, the biggest single growth (5.5 inches) occurs in the rear overhang. Surprisingly, while maximum width has increased less



SNOUT on front of air cleaner marks hopped-

**SNOUT** on front of air cleaner marks hoppedup car with four-barrel carb, dual exhausts, 180 horsepower. This is a test prototype; production cleaners may have fancy paint job.

than a third of an inch, hip room has grown by over three inches in front and still more in the rear.

Putting away the tape measure, the writer has tried on the new sedans and hardtops for size, which is 5 feet 11% inches. There weren't noticeable differences among makes, Front and rear sedan seats are amply wide, and have adequate headroom. As in the past, there isn't quite enough leg room for a tall driver, even with the seat full back. (You can get plenty of room by having the seat mounting relocated backward, though this crowds rear-seat riders.)

The hardtops are something else again. Getting behind the wheel involves the cautious navigation of your kneecaps past the lower comer of the wrapped windshield, and the simultaneous neck-bending needed to get your head in, too (This isn't a major gymnastic by any means though if you blunder into the car sleepily, a series of stimming blows will wake you up. Once in, the roof is noticeably close, though not oppressive until you try to stick your head out of the window—for example, on backing up. This is tricky and can raise bumps.

All three makers, well aware that hardtops are growing marginal, operate on the theory that most hardtop customers will willingly trade hat space for a sporty subouette. It seems an acceptable notion; but if your personal dimensions are on the long side, or if you will have elderly and nonphable passengers, it would be wise to have some trial fittings first,

Running gear and chassis. Ford has boosted brake-drum diameter on all wheels from 10 to 11 inches, which promises a substantial gain in both performance and lining life. The frame has a new swept-down shape out in back, behind the "kick-up" that clears the axle. As in the Thunderbird, rubber bumpers protruding from the frame tame the pretzeling tendency of the rear springs under heavy torque. Up front, the entire ball-

[Continued on page 248]

## Little Rambler Loses Its Pants

A LOT of motorists will give the 1955 Rambler a double-take in the next few months—those front wheels no longer wear pants. They're exposed. The beaded cutout gives the car a

shorter turning radius. Under the banner of the newly formed American Motors, combining Nash and Hudson, the Ram-



This is the season when heavy lead weights and spring clamps are at a premium in Detroit. The reason is that automobiles must be spring to accommodate a full load of passengers and luggage. Unloaded, they sit high on their running gear. Manufacturers' photographers use the weights and clamps to bring down the bodies and give the cars that long, low look.

#### New grille is second choice

ONE new car has a grille that was never intended for it a couple of years ago. Its manufacturer brought out a dream car with a handsome grille on it. The styling department looked and said Dandy!—that would be the grille for 1955. A competitor looked, too—and copied it for 1954.

#### V-8s beating out sixes

IN THE 1955 crop of ears, only nine retain six-cylinder engines. Sixteen will feature V-8s. Eleven of the 16 have been introduced since the model year of 1952. Four cars offer a choice between sixes and V-8s

#### Gas keeps pace

AUTOMOBILE gasolines—in premium grades—gradually are approaching the antiknock qualities of the fuels used by the airlines. With some new-car announcements still to come, one manufacturer already has a vehicle in production with a 9:1 compression ratio. That requires an antiknock rating within six or seven points of the airlines 100-octane. The 9:1 car operated without a whimper even on the West Coast, where gasoline quality is the lowest in the U.S.



bler will no longer be exclusively Nash. When Hudson dealers sell the car, it will be the Hudson Rambler.

#### Continental coming back

Four has confirmed the rumor that it will introduce during 1955 a "high-quality, low-volume" automobile to be known as the Continental . . . "a very modern version" of the Lincoln Continental produced from 1940 to 1948.

#### Glamour only skin deep

It's a good thing that you can't peek under the hood of some of the new cars so glamorously pictured in the newspapers on announcement day. You might not find an engine there. Used strictly for publicity-photo purposes, these automobiles sometimes contain no machinery whatsoever.

#### Wait'll next year . . .

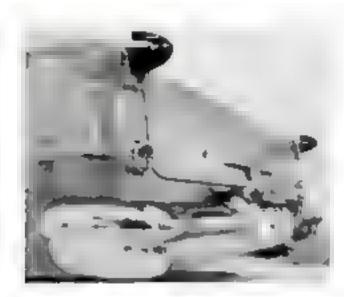
Don't look down your nose at your favorite car if it doesn't show much change in looks from 1954. It may be that 1955 is just not its "styling year." Customarily, auto makers change body dies completely only every three years. Mechanical refinements, year to year, are far more numerous than styling changes.

#### **Happy New Year!**

POPULAR SCIENCE MONTHLY'S automotive writers are striving to gratify your curiosity about new cars as fast as possible. Reports on the 1955 Pontiaes, Studebakers and Chevrolets appeared in the November issue. A dozen new cars are featured in this "auto show" section this month. There'll be more newsy articles about American cars—including a detailed tabulation of 1955 car specifications—in future issues.



Oldsmobile are accented by strip of stainless-steel molding that dips from rear doors and then spears forward past the front fender opening. Shown here on both Super 88 (left) and Series 98 (below) this strip provides color separation in two-tone jobs.



styling changes include bullet-shaped tail lights (left) that combine rear light, stop light and turn signal. Only back-up lights are separate. Trunk lock is concealed in the emblem, which has a ring around it to serve as a handle. New front end (below) features recessed headlights, flattened parking lights, redesigned emblem.





FOR years now, man and boy, it has been said that only a dunce will try to beat an Oldsmobile away from a traffic light. For 1955 the advice is still as good as gold unless you drive a sports car or drape carburetors all over your engine.

The newest editions of this automobile are up in torque and, of course, horse-power. Olds has always used its valve timing for the best push at the rear wheels in the lower and middle-speed ranges.

A Super 88 four-door sedan toting four passengers will reach 60 miles an hour

from taw in 10.8 seconds. That's with fourth gear on the Hydra-Matic transmission locked out. As an indication of take-off torque, the car is only 9/10 of a second faster in reaching 60 when the accelerator is mashed from a steady 10 miles an hour.

The time from a steady 40 miles an hour to 60 is a mere 5.5 seconds, and that from a steady 50 miles an hour to 70 only 6.5 seconds.

The performance is due to high torque output—330 pounds-feet at 2,400 revolutions of the engine for both Super 88 and

## Olds Holds Take-Off Title

Again it's at the top in breakaway performance, thanks to a hefty hike in engine torque at low and middle speeds.



Series 98 lines. For 1954 the torque was pegged at 300.

Horsepower is up from 185 to 202 at 4,000 r.p.m., and the compression ratio from 8.25:1 to 8.5.

The regular Olds is only a couple of steps behind. Torque on the 88 is up from 295 to 318 at 2,000 rp.m., and horsepower from 170 to 185 at 4,000.

You think you can't get air conditioning in a convertible? Try Olds. That's possible because the ducts carrying the cool air have been ripped out of the sides of the roof and put down on the dash. Twin, adjustable nozzles protrude from either side of the panel.

The entire air-conditioning system is a lot simpler and lighter, too. All that apparatus in the trunk—the evaporator is now lodged entirely in the engine compartment. More cooled air comes in, even at engine idling speed, and every molecule of it is fresh.

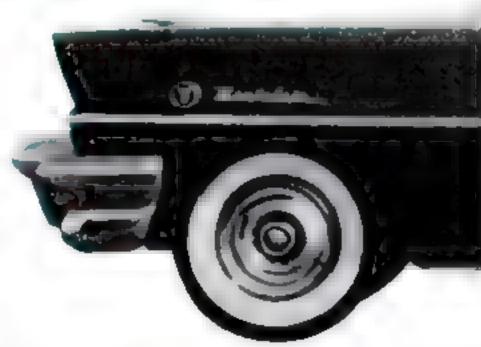
The Olds ride for '55 is even smoother on rough roads, due largely to a new type of softer front shocks.

Tubeless tires are standard equip-

ment.—Devon Francis.

## Mercury Grows Faster and Sleeker

A bigger engine kicks up power to 198 hp; and handling is improved to match. There's a new line, too -it's low, lush and multicolored.



AVY-LIDDED lights, bumpergrille combining Merc and Lincoln touches, are recognition features in front. In back: new tail lights and flattened dual pipes. 1955

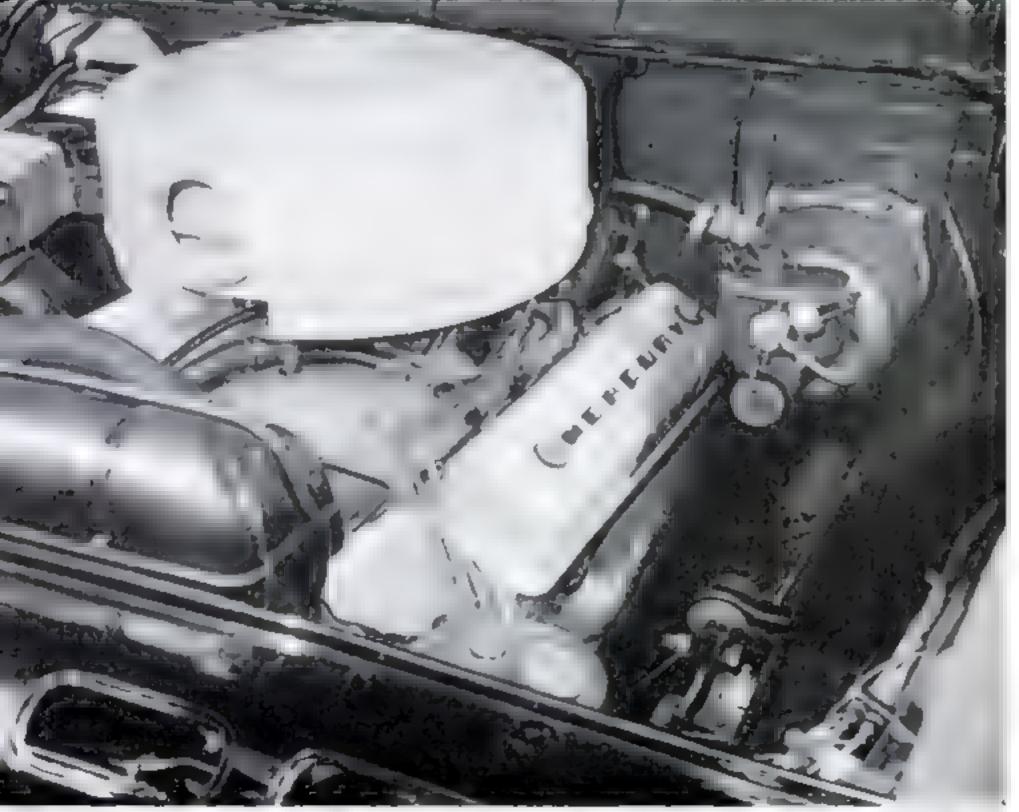
ACCORDING to some curbstone critics, a Mercury can vary in virtue from year to year, like wines and ball teams. "Take that Klunkpot Six," one of these sidewalk sages may say, "and you've got a heap that never changes much, and never does much except keep going. Take Mere, though, and you just don't know. One year she's hotter'n a pistol; next year, she's apt to be throbby or bulgier than a lady buffalo."

If there is a pubbin of truth in this folklore, which seems possible, note down '55 as having all the earmarks of a vintage year for Ford's big brother. On spees, Mercury is at or near the top of its class in most categories. On looks, it's sleek enough to draw whistles. And on the high-speed track it is a doozy to drive -quick, smooth, and surefooted. It is the kind of car you would want as a good

companion on a long, fast trip.

Performance. Driving an automatictransmission sedan, I elocked zero-to-60 accelerations of 13, 12.8 and 12.5 seconds, which is right up with the best, and faster than any fully grown driver should want. The more important 50-to-70 time -it establishes highway passing abilitywas a flashing 7.9 seconds. Top speed is about 107 m.p.h. true with an automatic drive, and a mile or two faster with over-



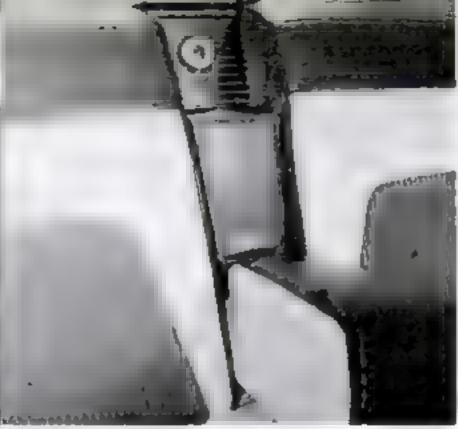


TOADSTOOL air cleaner hides redesigned four-barrel carburetor underneath. They're getting

the engine-room clutter under control—this job has both power steering and power brakes.



PIE-FACED instrument panel is easy to read. Hump in floor looks high (it's about one inch higher than in '54) but a six-footer can still take the middle position without contortion.



LUXURY of the new Montclair line, which pushes the Monterey down to middle spot in fanciness, is symbolized by medallion behind rear armrest. It lights up, but doesn't say "Tilt."



ONE FINGER unlatches hood, though safety catch is retained. First part of finger's travel unlocks main catch, and further movement then releases the separate "anti-fly-open" catch.



MERCURY CUSTOM is the Plain Jane, though not exactly stark. Note Merc-identifying "mump" just ahead of rear wheel. Ground clearance, down .6 inch, is still a healthy 7.2 inches.

drive. Handling is there to match. They've lowered the car a couple of inches, tacked an inch on the wheelbase (now 119), and added a fat three inches to the rear tread. They've jiggered the spring rates, changed the shock valving, and held weight very close to '54's 3,700 pounds. The result is a sweet road carone of the handful of U.S. cars at any price that doesn't itch for the ditches at speeds over 80. About the only thing that may sadden you is the steering ratio, which remains at 254-to-1 over-all. It feels all right but is a trifle slow for a joyous temperament.

More engine. This showy behavior (the accelerations press those of the '55 Lincoln') springs from a 292-cubic-meh engine, up 36 inches this year. (The stroke has increased from 3.1 to 3.3 inches; the bore has grown from 3.62 to

3.75) At 8.5-to-1 compression and with dual exhausts, it delivers 198 horsepower. At 7.6 compression and with dual headers feeding one muffler, it produces 188 hp. The torques of the two versions are 286 and 274 pound-feet, compared to last year's 238. While the higher-compression job wants premium gas, Merc engineers swear the 7.6 one will run on regular without degrading the spark timing.

There's more changed about the engine than the displacement. It has a redesigned four-barrel carburetor with the choke plates taken out of the air horns for freer air flow, topped by a fancy new cleaner that sucks from a big hole up front, (Prediction: watch for Mere to run a duct from this up to the front before long.) It has a new camshaft that respaces valve events to get the most possi-

[Continued on page 236]

#### THE 55 CARS





in the torque.

for kickdown,

the oil flow

converter change

## Dynaflow transmission pinches an idea from airplane props to add push to the rear wheels.

A COUPLE of years ago the Buick people sat back and took a hard look at their automatic transmission. It was only five years old, It was newly improved, But it needed something else, It lacked a "kickdown" into a lower gear ratio, like that on other automatic drives, for passing.

Last month the results of the hard look, and of intensive research, were announced. For 1955 Buick has a kickdown.

But it's different. To understand the change in Dynaflow, Buick's pioneering effort in torque converters for passenger cars, you must understand the company's insistence on a silk-smooth power flow from engine to rear wheels.

All other U. S. cars equipped with

SECRET OF EXTRA BUR57 OF SPEED lies in putting Dynaflow's stator blades in flatter pitch, as shown in top photo. In bottom photo blades are in cruise position. Spring-loaded annular piston has constant 45-pounds-per-square-mch oil pressure on side pictured. Piston moves, cranking down blade pitch, when 45-pound pressure on other side drops.



STYLING CHANGES on outside cover head and tail lights, grille, bumpers, rear fenders, hood emblem, "portholes," wheel disks, deck-lid emblem and—on Super and Roadmaster series -rear-window molding. Tubeless tires are standard except with wire wheels. Revised transmission gives Super series as much as a mile more per gallon of fuel. All Buicks except the Special are upped to 9:1 compression.

torque-converter transmissions have a box of gears behind the converter to step up the performance. The gears shiftjust once—as the car takes off and gains speed. The transition results in a thump. For passing, the motorist merely presses harder on the accelerator. That downshifts the gears, like going from high gear back to second with a manual shift.

Buick has had no shift, no thump. But neither has Buick offered the customer that sharp increase in engine authority for passing.

Now Buick does, without shift or thump. This was accomplished by borrowing an idea from the airplane indus-

SELECTOR QUADRANT for automatic transmission has been moved halfway down steering wheel post. Three-spoke wheel on '55 models is narrower and has a hub of smaller diameter.



try. In an airplane equipped with a fixedpitch propeller, the pitch has to be set midway between the best thrust for takeoff and the best thrust for cruising.

The compromise, like most compromises, is unsatisfactory—take-off time is lengthened and cruising speed suffers. With a prop that can be altered in flight, however, at take-off the pitch can be flat. In cruise, the prop can take a bigger bite of air.

The oil-filled innards of the Dynaflow transmission, like those of all torqueconverter drives, contain the equivalent of the elements of an airplane prop. It's called a stator. It's a little wheel with curved blades on the hub.

#### Tiny Blades Help Increase Torque

The blades redirect the flow of the oil as it comes out of the turbine and goes back to the pump so that the oil will help instead of hindering the rotation of the pump. That's what multiplies the torque coming off the engine crankshaft. It's what distinguishes a torque converter from a simple fluid coupling.

Up to now, the Buick blades, like those of other torque converters, have had a fixed pitch. It was a compromise. At breakaway the automatic drive didn't satisfy the motorist who wanted a jackrabbit start. At cruise, it didn't give as

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much zip as it should have. And it couldn't be kicked down for passing

That's all changed now, For extra push at the rear wheels, the stator blades flatten out, giving the oil better direction as it comes out of the turbine into the pump. This boosts torque. For cruise, they swivel around to take a bigger bite of oil. This betters performance and saves gas. For passing, they flatten out again to provide an extra burst of speed.

#### Trigger Toes Get Bullet Performance

And the whole operation remains silksmooth

The results should be deeply gratifying to the motorist with a triggered accelerator toe. The 1954 Buick Super sedan, for instance, took 15.3 seconds to reach 60 miles an hour from breakaway. The 1955 Super, kicked down, does it in 12.5 seconds. The same car, kicked down for passing, jumps from a steady 40 miles an hour to 60 in 6.2 seconds, and from a steady 50 up to 70 in 7.8 seconds.

Horsepowers in all the Buick lines have shot upward again, for '55, and of course that too helps performance.

As in other torque-converter cars, the kicking down in the Buick is done through the accelerator linkage. At a given point, you have to press harder to put the blades in flat pitch.

The yardstick of efficiency for the fixed-pitch stator is how low an r.p.m. the engine will register when it is held at hard throttle against the brakes. For 1955, Buick's engine speed without kick-down has dropped several hundred revs.

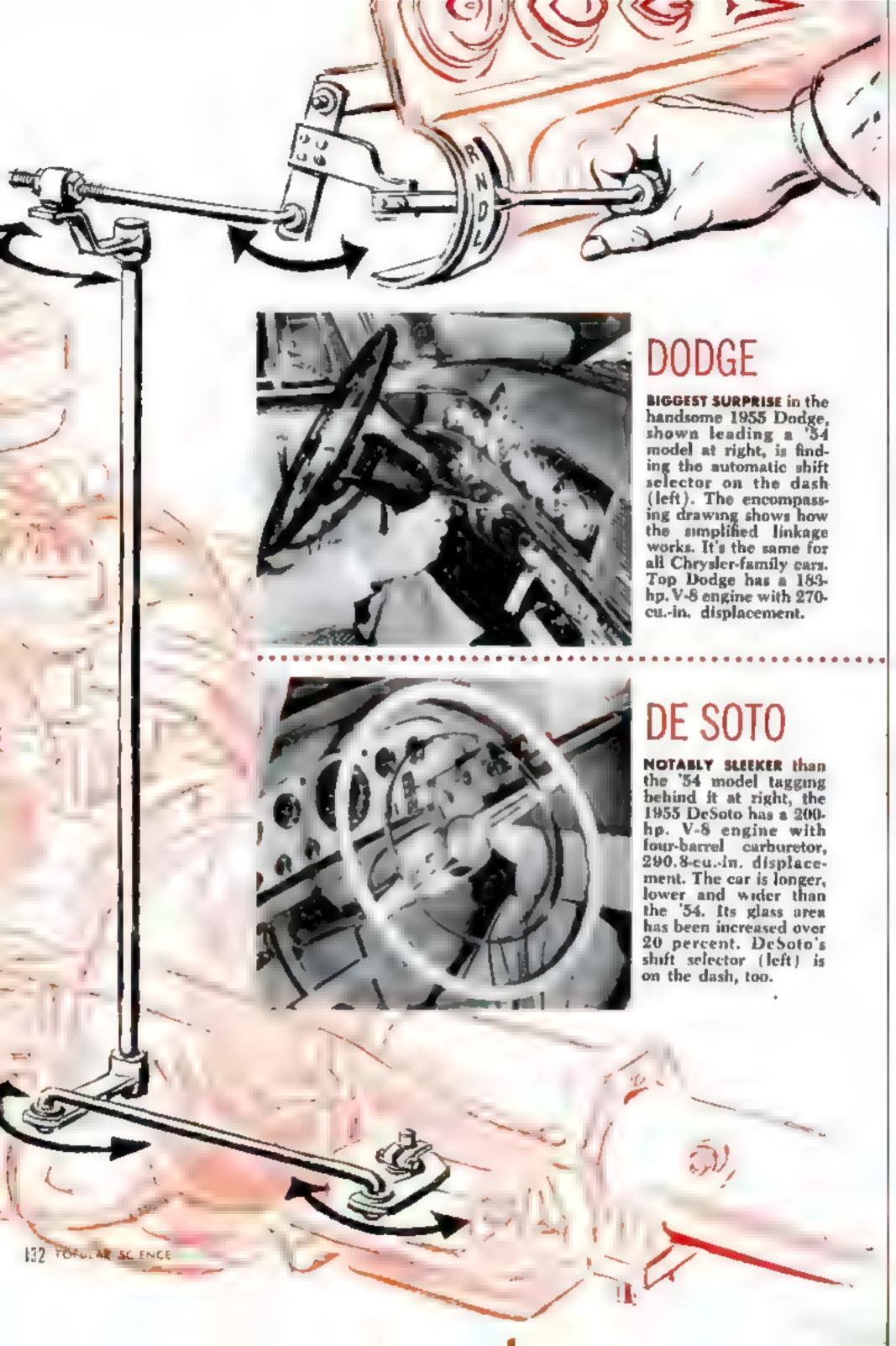
But kick it down, and the r.p.m. shoots np. From a standing start, that eats gas. The jack-rabbit performance comes not only from a greater torque multiplication but also from the higher engine speed and more torque from the crankshaft.

Gas-wise, kicking down at cruising speeds is less critical—the engine doesn't have to work so hard to increase the car's speed, once the rear wheels are turning smartly.

#### Century, Super. Get Roadmaster Holes

Buick has made another change for '55 that will confuse all but the professional car-recognition experts. It used to be that four fender "portholes" marked the top of the company's line of cars, the Roadmaster. Now the holes, round instead of elliptical as in '54, number four on the Century and Super lines, too.

The reason is that all have the same horsepower, a whopping 236. Only the Special, with a meager 188 horsepower (shades of 1951 when the Cadillac boasted about a mere 160 horsepower!), has three holes.—Devon Francis



## These Cars Made a Hit Even in Disguise





Masked '55 Dodge and DeSoto collected crowds on 800-mile mystery run four months ago.

By Wesley S. Griswold

"MAN, those are real cool cars!"
The speaker was a 17-year-old lad in blue jeans, who was standing on an

Ohio street corner one hot morning last July. A mysterious cavalcade of automobiles, wholly unrecognizable to this connoisseur of body lines, had just rolled past him and drawn up to a nearby filling station.

Though there was no way for him to tell at that moment, he was looking at 1955 Dodges and DeSotos, out for an unheralded test run in disguise.

The young man raced over to the pumps, seowled for a frustrated moment when he discovered that masking tape covered the names and insignia of the cars, then proceeded to admire their sleek contours.

#### The New Look: Longer, Lower, Fleeter

He had to ask the names of the cars. for there was little in their looks that related them to the 1954 models, with which he was familiar. Once they had been identified, he could easily see that

the '55 jabs, not to be shown to the U.S. as a whole until four months later, were longer, lower, fleeter looking and a bit wider than their predecessors. Their headlights were hooded, their windshields the wrap-

around type.

Friendly drivers in the halted cavalcade permitted the young man to discover for himself that the automatie-transmission selector had been taken off the steering post and mounted on the dash. He spotted the tubeless tires and found out that they would be

standard equipment for the '55 models. Auto engineers, along on the trip. answered his questions about engine changes, revealing that the biggest Dodge would put out 183 horsepower (up 33 from 1954) and the biggest DeSoto would

produce 200 (up 30 from 1954).

By this time the fuel tanks, bigger than ever before, were brimming and the little group of cars was ready to move on.

On through the baking Midwestern countryside swept the small parade of masked cars, as free of identifying marks as a spy in enemy territory but as conspicuous as a popular movie star in dark glasses.

For 800 miles these 1955 Dodges and DeSotos, normally protected from the public gaze by elaborate security measures, traveled a widely varied route through states adjacent to Michigan

One popeyed car dealer hopped into his own vehicle and followed them for miles until they stopped for the night and he could satisfy his curiosity.

At the big motel where the drivers stayed, guests and local people quickly gathered around the parked cars, opening doors, fingering levers, subjecting the drivers to an insistent quiz.

The public's reactions, as well as the drivers' own, were duly reported when the cars had disappeared once more behind the guarded gates of the Chrysler

> Corporation's new proving grounds at Chelsea, 65 miles from Detroit. The terms of the report would have piqued your interest as much as a first glimpse of the cars

Opposite a check list running from "Appearance" to "Wipers," and including "Body Shake," "Instruments," "Prop. Shaft" and

19 other items, you would merely have found numbers. The numbers ranged from 1, meaning "Unbearable," to 10, standing for "Perfect." They represented completely candid opinions,

and a test driver is a severe critic.

Immediately the plant laboratories and the proving-ground staff went to work to eliminate the kinks that had provoked low-number comments

So intrigued are the test drivers by this numerical lingo of theirs that they often use it off duty. When one of them wants to alert the others to the approach of a pretty girl, he may yell, "Here comes an 82!" That means that the young lady is rated better than Excellent, just a shade below Superior.

#### Mountains and Desert Test New Ports

Before the 1955 Dodges and DeSotos made their shakedown cruise through open country, every new component but the shells had already been through se-

[Continued on page 246]



BIGGER FUEL TANKS, with fill pipes tucked away behind the spare tires to make more luggage room, are incorporated in both the Dodge and the DeSoto (above).

## Top Horsepowers Go Still Higher

#### CADILLAC

at 240 horsepower has a compression ratio of 8.75:1, up from 8.25. Higher valve lifts and rocker-arm ratios add zip. Options in one model hike power to 265.



#### LINCOLN

at 225 horsepower has a compression ratio of 8.5:1, up from 8. Displacement is boosted from 317 to 341 cubic inches, higher than Caddy's or Chrysler's.

#### **CHRYSLER**

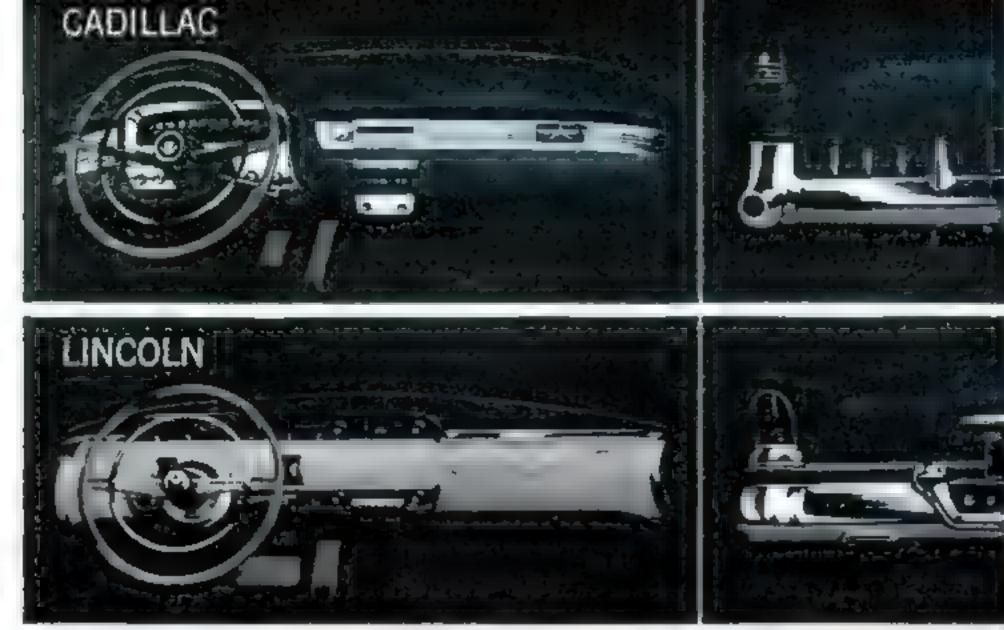
at 250 horsepower also has an 8.5:1 compression ratio, up from 7.5. Revised carburction peps up performance. For first time, car requires premium fuel.

It was oomph, not speed, the engineers were aiming at when they jacked up the torque in the new crop of "brute" cars.

By Devon Francis

THEY have a saying in Detroit, home of the horseless carriage, that nobody knows what the horsepower of a new model is going to be until the sales department has announced it in the public prints.

Like all generalizations, this one is





Cadillac and Lincoln have been prettied up fore, aft and inside, while the Chrysler has

only partly true. But it's close enough to the mark to make the engineers run a temperature.

Last month, with a shower of new-model announcements, the men with the slide rules were sore again, Horsepowers—again—were up. Sales departments—again—were telling the customers that here was the hottest thing on wheels.

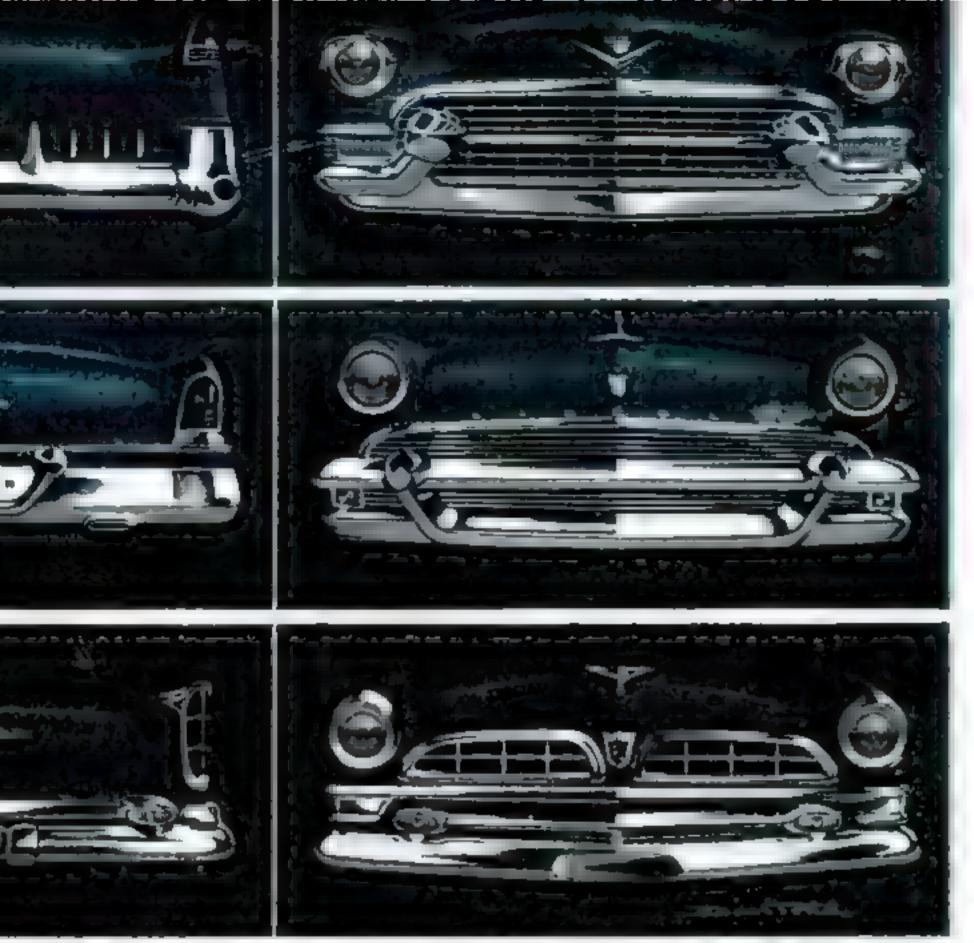
Horsepowers in the chi-chi car field, naturally highest, crept inexorably toward the 300 figure. This was almost twice the horsepower of the brawniest of the heavyweights five years ago. Chrysler was up, Cadıllac was up, Lincoln was up, And, come Packard's exposure to public view after the turn of the year, it certainly would be up, too.

As this magazine went to press, Chrysler for '55 stood at 250 hp., up 15 from '54 Cadıllac was at 240, up 10, with an option in one model of an even wilder 265. Lincoln was at 225, up 20.

But there were telltale signs that the engineers, at long last, were making with the facts, even to their sales departments. They had raised the horsepowers, true, but only incidentally, Their real interest was twofold: gas economy and brisker performance at low and medium speeds.

#### Farther and Faster-on Less Gas

All three of the brute-size automobiles will go farther in 1955 on a gallon of gas—up to two nules more. All three will show more snap when the light turns



a series of new bodies that are up to three inches longer, and an inch and a half wider.

green. All three will cut out and around a car ahead on the highway and ease back into lane in fewer seconds.

The fuel economy is due to higher compression ratios that squeeze more comph out of the gas, and to low rearaxle ratios that slow down engine revs.

"Breakaway" and passing performance results from added torque, not horsepower. Torque is what plasters you to the back of the seat when you hit the accelerator. Torque is what the sales departments have never bothered to explain.

Well, the engineers have given the sales people their lumps for '55. They've produced torque. Stressing torque, the engineers take top-speed performance—a product of horsepower—for granted.

The new Chryslers, Cadillaes and Lincolns will all break three digits on the speedometer going away.

All three cars have tubeless tires.

All three offer the extras that can easily add \$1,000 to the base price—power steering, power brakes, power seats, automatic windows, and air conditioning. Automatic transmissions are standard on the Caddy and Lincoln. They are still optional on only one Chrysler line.

Now take a look at them individually:

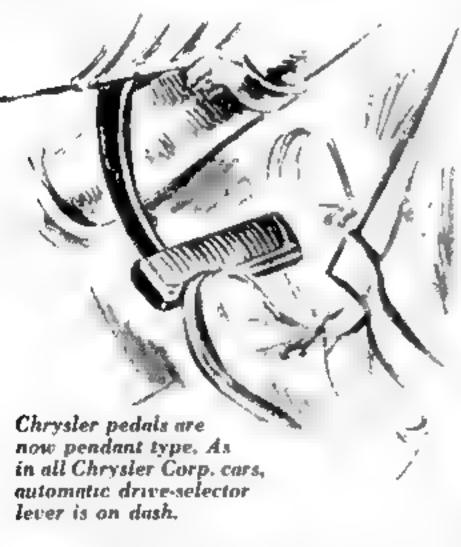
CHRYSLER As a sample of the new line of Chryslers, the New Yorker De Luxe may well be the prettiest brand-new automobile of 1955. It's longer. It's lower. The roof slants inward

more from the car waist. The design lines, to quote the lyrical press releases, are "taut."

"We want a car," Ed C. Quinn, president of the Chrysler division, told his stylists when the vehicle was in the planning stage, "that will do the same thing for a woman that a mink coat does."

That was in 1952. The car was scheduled for introduction in 1956. To get a hold in the fine-car market, which had been almost wholly proselyted by Cadillac, Chrysler advanced the announced date a full year.

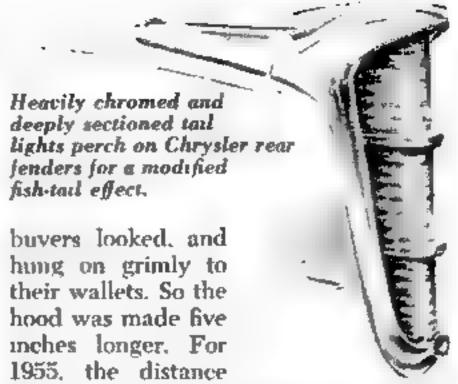
There were thousands of problems, among them the one of deciding what kind of posts to put on the new wraparound windshield. In the clay-model stage, experimental posts were tried out that pointed alternately at the moon, the sun and the intersection of New York's Lexington Avenue and Forty-second Street.



Quinn thinks the one chosen is wellnigh perfect for eliminating hazardous blind spots.

A minor question was whether to attach an ornament to the sports-car-type hood. The sales and advertising people voted. Half were for, half against, in the end the croament went on.

The hoed had been too short. Potential



from the front of the engine block to the tip of the front bumper is a full yard.

Quinn, a six-foot, 200-pounder with an eye sharpened by bear bunting in the Rockies and Alaska, happily points out that the new Chrysler has borrowed a couple of items from the K-310, a Chrysler dream car of 1953. One is the hood lines. The other is the push-pull type of door handles

Mechanical improvements are legion. The Chrysler has torque to spare. It can accelerate from zero to 60 with two people aboard in 12.1 seconds.

#### There's No Shortage of Horses

It has one foot-pound of torque for every 12.7 pounds of car. And, if you are interested in power, its pounds-horse-power ratio is right down there with 17.3.1. It also figures out to .79 horse-power for each cubic inch of cylinder displacement. A low rear-axle ratio of 3.36-to-1 helps gas mileage

The power-brake mechanism is combined with the master cylinder for compactness. Springs are outboard of the frame at the rear to reduce body roll. Airplane-type shocks replace the lever type in front

The Chrysler Windsor De Luxe line (nothing is plain any more, it's all De Luxe), less fancy than the New Yorker De Luxe line, has a new V-8 engine with smaller holes for the pistons and, unlike the New Yorker, single rocker arms for each bank of cylinders. Horsepower is 188. Chrysler will no longer produce a six-cylinder Windsor.

In 1954 Cadillac produced a huge share of the "fine" cars sold off the showroom floors. It's the only car that still has a buyer waiting list. So, with a good thing, Caddy isn't cottoning to much change in looks.

The bumperettes—"Dagmars" to Detroit—are bigger for '55. That distinctive molding marking the start of the rear

fender is now interrupted.

But mechanical refinements are numbered in the dozens. The ratio in first and third gears of the transmission has been changed to supply added torque for take-off and passing. Air tubes bypassing the butterflies on the carburetor obviate any tinkering with the idling speed, once it's set. A bleed-off for gas vapor when the

Caddy's windshield wipers pivot on a cam to get around far corners of the windshield wrap-around.

engine is hot prevents stall in firing up. Crankshaft pins are shorter, journals wider for greater rigidity and engine smoothness.

Spark plugs are colder to accommodate a higher compression ratio. A change in valving softens the rear shocks. A boost in vacuum on the power brakes makes pedal pressures softer. And in case of vacuum failure, the pedal requires no more push than that on non-boosted brakes

Instruments are more legible, and did you ever miss the ash tray with a cigarette on a dark night? A light has been added to it. The air-conditioning system has a bigger capacity to produce cool air, and a thermostatically controlled electric clutch on the compressor tailors its output to the temperature of the car's insides.

But maybe Caddy's biggest news is a hell-for-leather optional engine in the El Dorado convertible. This 265-hp, job has two four-barrel carburctors—a barrel for each cylinder. They help skyrocket horse-power but add only a smidgen to torque.

The El Dorado is no car for the guy with a bilious eye at the gas pump. Shift speeds in the automatic transmission are clear up for jack-rabbit accelerations. (Torque curves, to a point, zoom with the revs.) The tolerances in the fluid coupling are looser, to boost the engine speed as much as 800 revolutions for take-off.

#### That Stronk Is a Caddy

Fully loaded, the Caddy Special four-door sedan will streak from zero to 60 miles an hour in 11.7 seconds. The El Dorado does it in 10.8.

The regular Caddy develops a footpound of torque for every 13 1 pounds of car. Its engine totes only 18.8 pounds for each horsepower. It produces .72 of a horsepower for each cubic inch of cylinder displacement. The rear-axle ratio is 3.07:1. The comparable figures for the El Dorado: a foot-pound of torque for each 13.8 pounds of car; 14.4 pounds of car per horsepower, and .8 horsepower per cubic inch, The axle ratio is the same.

UNCOLN The engineers at Lincoln were unabashedly out after torque. They got it by camshaft design and more cylinder displacement (341)

Most obvious change
in Lincoln styling is
bas-relief portion of
rear fender and a
V-like tail light.



#### Luxurious Imperial Leads Chrysler Line

For the citizen with scads of folding money, the Chrysler Corp. is producing for '55 a car embodying everything that

a motorist could dream of: the Imperial A hardtop version—without the center post—is pictured here.

Starting with an engine of 250 horsepower, name what you'd like. The Imperial, showpiece of the corporation's five brands of cars, has it. The car comes in two lines, Custom and Crown.

cubic inches, as opposed to last year's 317). They got a spirited 332 poundsfeet of torque as a result, up 27 over 1954. Compression ratio has gone up, too: 8.5:1 from 8. A horsepower rise was clearly inevitable.

The Lincoln hardtop with two aboard will hit 60 from a standing start in 12.5 seconds. Starting in Low Bange on the automatic transmission and upshifting manually at 35 m.p.h. will clip a fraction-

al part of a second off that,

It is the handling characteristics of the Lincoln that distinguish it. Lincoln has won the Mexican Road Race with depressing regularity, not with an exceptionally high top speed but by its agility in getting out of the "corners"—the turns—at good car speeds and high torque output. Suspension and steering help measurably.

For 55, the Lincoln at last has its own, home-grown transmission, a torque converter like that on its sister cars, the Mercury, Ford and Thunderbird, to replace the Hydra-Matic. And, like the

others, it can be shifted into low for quicker take-off by a harder push on the accelerator (PSM, Oct., p. 131). The Lincoln people are calling their new transmission Turbo-Drive

#### Exhaust Pipes Double Up

There are other improvements. A new air cleaner cuts down the restriction of air to the carburetor. Dual exhaust pipes—and bet your bottom dollar that this idea originated with the sales department—reduce exhaust back pressures a bit to facilitate engine breathing. New valving and mountings of the shocks improve the ride.

As with Cadıllac, the styling has been touched up here and there.

The Lincoln Capri hardtop has a footpound of torque for each 13.4 pounds of car. The car weight works out to 19.8 pounds per horsepower. The OHV V-8 produces .66 of a horsepower for each cubic inch of displacement. For gas economy, the rear-axle ratio has been cut from 3.31:1 to 3.07.

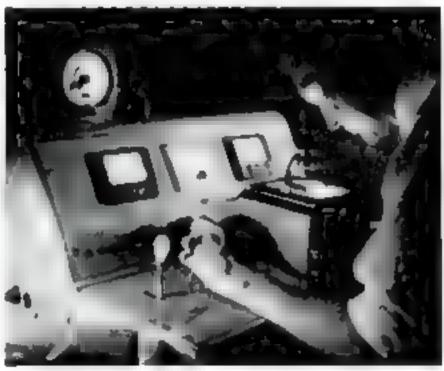
#### 'Barber Poles' Keep Tabs On Missiles

This odd-looking contraption is a target for data radioed back from guided missiles in flight. For "automatic positioning of telemetering antenna," it was nicknamed the "apota" at the Government's Sandia Laboratory in New Mexico where Western Electric is working on military applications of atomic energy.

▶▶▶Work on the first atomic submarine has turned up new facts on water. When very hot and under pressure, its power to rust is far greater. At 600° —under pressure that keeps it from boilung at the normal 212°—it disintegrates aluminum and magnesium in hours.







#### What You See Inside a Flea with This New X-Ray Microscope

A common dog flea looms up like some translucent monster when seen through the new X-ray microscope at right above. The instrument has an electrostatic lens system that provides an X-ray source 300 times smaller than a human hair. The image pro-

duced when the rays penetrate an opaque object is magnified up to 1.500 times, revealing the structure of metals and living tissue. General Electric expects to produce the device for use in medical science, biology and industry.



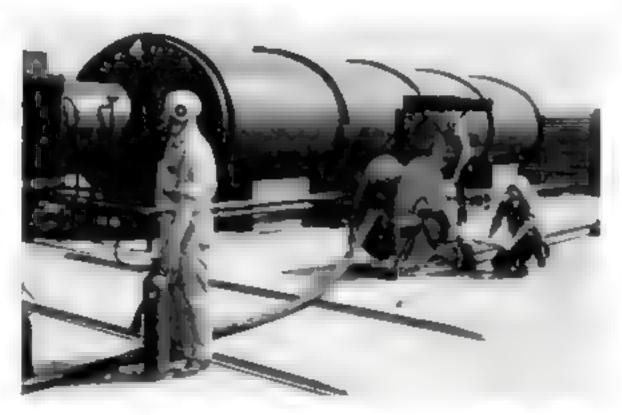
#### Huge Plastic World Lights Up at Night

IT TOOK 1,000 pounds of plastic and two years of work to make this giant outdoor globe for a Racine, Wis., factory. Sea-green Plexiglas wedges inset with continents in relief are fixed to a steel framework. Bronze clips permit contraction and expansion with changes in temperature. Symbols on the 11-foot illuminated sphere mark Johnson's Wax plants and offices all over the world

#### Helmet Earmuffs Block Out Jet Roar

Just a big noise—that's life on a test ramp for jet engines. Special mufflers cut down the roar; but to bring it to a safe level, mechanics at McDonnell Aircraft (right) wear helmets that deaden the sound.

Two-way-stretch inserts keep built-in pads of sponge rubber snug against their ears and the sound-sensitive mastoid bones.





#### Piano Weighs Only 75 Pounds

You can carry this piano with you. The 75-pound electronic instrument uses reeds instead of strings, plays through earphones or a radio. Invented by B. F. Miessner, it will be made by Rudolph Wurlitzer Co., 165 W. Adams St., Chicago.



#### Midget Dryer Warms Room

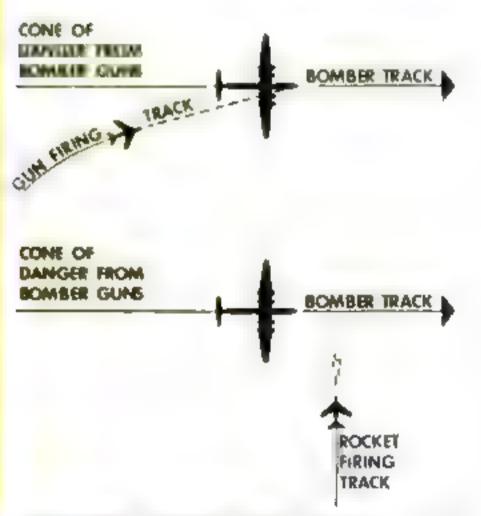
THE Dryette above will tumble-dry hugerie or baby clothes in a few minutes. Turn on the heat alone, and it will also warm up the room. With a hose attached it's a hair dryer. Tibbits Mfg. Co., 34 W. Chestnut St., Alliance, Ohio, makes it.

ROCKETS STREAM OUT to intercept cloth target (top) by crossing its path at precisely the right instant. Target passes through the shotgun pattern and emerges showing hits (bottom).

### Radar-Aimed Rockets Blanket Target With Shotgun Pattern

Sabrejet pilots describe a new Air Force interceptor technique. Leading the target while moving in on it broadside, the F-86D sprays out rockets in a shotgun pattern to bring down its quarry while on target only a few seconds. By flying a lateral "collision course," the interceptor avoids the bomber's tail guns and forces it to defend itself from an attacker that is rapidly changing its angle of approach.

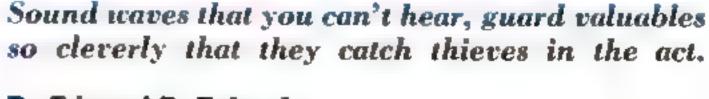
Actually, the Sabre pilot never sees his target but watches a pinhead-sized blip on his radarscope. If he keeps that properly centered for two or three seconds, he's certain of a hit. Automatic computing machinery lowers the plane's rocket pod and fires the Mighty Mouse rockets when within range. One hit will bring down a bomber.



GUN-FIRING FIGHTER making a pass at a well-defended bomber must enter a deadly cone of fire from the enemy's tail guns. With rockets, fighter makes safer side approach.



## That Habs Burglars



#### By Edward D. Fales Jr.

A BURGLAR was spending a busy Sunday in Newark, N. J. At six a.m. he jimmied into a liquor store. At four p.m. he sawed a padlock and stole the Saturday-night receipts from a grocery store. Feeling his professional oats, he then, at midnight, climbed to the roof of a jewelry store. For days he had cased the store for photoelectric beams, tinfoil window tapes or night watchmen. With a master's skill, he had figured out a foolproof way to enter, by cutting a hole in the roof

He worked fast, jimmed the skylight, lowered himself inside the store. Four minutes later he was scooping \$40,000 worth of diamonds into a bag.

That was when the "space police" arrived. They burst through a door and walked in with drawn guns. But there was no fight. Professional burglars are born gamblers, and this one was no exception. "I lose," he said, "Where did you guys come from?"

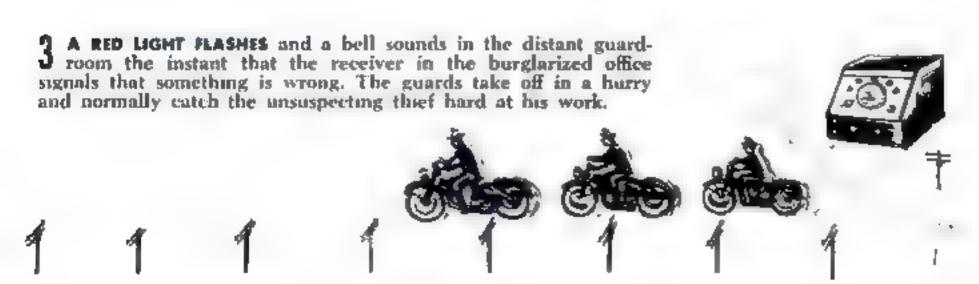
There was utter disbelief in his eyes and disgust in his voice. He knew there had been no one near the store, and he knew he hadn't tripped any of the Newark District Telegraph agency's regular plarms.

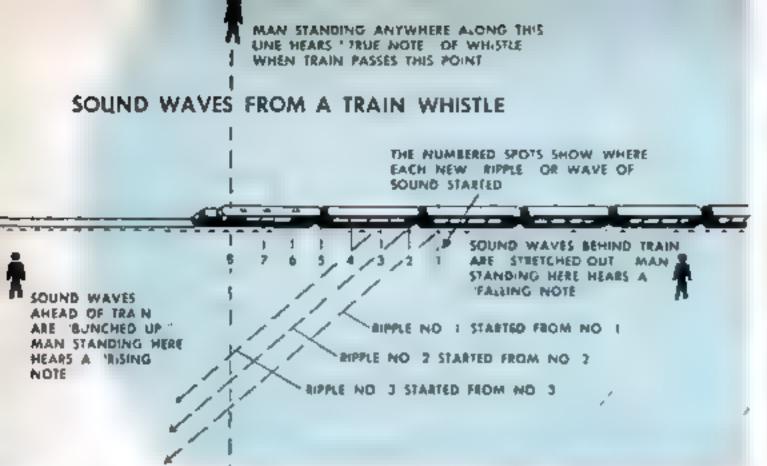
#### New Device Is Unfair to Burglars

A detective pointed to an inconspicuous little box on a wall. "You set off our new space alarm," he said. "You can't hear it, but it hears every move you make—even your breathing. In fact, it's going to put you fellows out of business."

"Holy cow!" the burglar complained. "That's unfair!"

This case was related by Manager Frank Guibert of Newark





WHY IT WORKS: A train whistle seems to rise in pitch if the train is moving toward you, and fall if the train is moving away. This is the well-known "Doppler effect." Another aspect of it is that even if both the train and you are standing still when the whistle blows, its tone will sound slightly different to a sharp ear if a moving object happens to go by at the time, reflecting the sound waves. The Kidde ultrasonic burglar alarm utilizes this principle.

District Telegraph, first detection agency to use space alarms on a commercial basis.

The unlucky thief had been trapped by man's newest anticrime weapon—an uncanny ultrasonic alarm that makes burglary, file-rifling, or even simple trespassing, practically impossible.

The "space alarm" is the Walter Kidde Company's newest ultrasonic device. It's catching burglars faster than you can swat flies.

In Manhattan not long ago Seaboard & Western Airline was having burglar trouble in its freight warehouse. So the Kidde people installed one of the new space alarms.

#### Screwdriver Sounded the Marm

"One night," they reported, "the detective agency began to get some unusual signals. The red alarm light would flicker for a second, then go out. Obviously no one was in the freight house or the light would stay on and the bell would sound. It looked like equipment trouble, so a man was sent by subway, rather than in a squad car, to find the trouble and fix it.

"But when he entered the building he heard someone running off the roof. A burglar had been jimmying the skylight—and our faithful equipment, not having disturbance enough to send us a full-fledged alarm, had still managed to give us a fluttering signal every time the point of the burglar's screwdriver came through the skylight!" In Texas a businessman had been robbed so often he got mad and ordered a space alarm installed in a hurry. The technicians stayed on the job until 11:30 p.m., finishing the installation. Then they went back to detective headquarters to check the line. As they arrived, they found something was wrong, The alarm was "ringing in" when it shouldn't have been.

The weary engineers went back again to the business place and had the surprise of their lives: They'd caught themselves a burglar—30 minutes after the installation.

"We used to get them while they were working," says Newark's Frank Guibert. "But now we get 'em before they even get started!"

Space-alarm experts have learned to be surprised at nothing. There are 700 alarms in use today, and surprises began with the very first one installed.

One surprise case involved a big appliance store in Newark.

#### Police Set a Trap

"For two nights," says Frank Guibert, "District Telegraph had been getting alarms from this store. It was a huge place, 250 feet long, with lots of air space. The rooms were filled with washing machines, radios, jewelry, TV sets and so on.

The first night we rushed men by car but found nothing wrong. Obviously it was a false alarm. But when we made line tests, everything checked out per-

fectly okay.

"Next night, toward midnight, the alarm came again. We were there within three minutes, turned on the lights, but you nothing

but saw nothing.

"On the third night we decided to hide in the store and wait. It was dark and deadly quiet. For a while we heard nothing. At 2:10 a.m. we distinctly heard the relay click in the receiving instrument on the wall. The ultrasonic waves had detected something moving in the dark near us—something we could neither see nor hear.

"We jumped up and turned the lights on. An instant later we saw a small dark object come whizzing through the air. It came through the door from the next big room, and it flew straight toward the transmitter dome on the wall. Then we saw that it was a bat. At 2.13 a.m., we suddenly heard a door open and our other guards were there with the police, just three minutes after we heard the relay click."

Space alarms have revealed fires, windows left open, broken steampipes and employees locked in washrooms after closing hours. In one bank an alarm went off when a setscrew became loose in a big ventilating fan. The fan stopped turning but the screw was beating out a fast tattoo on the flat side of the spinning shaft. This set up a vibration in the floor that tripped the alarm.

#### They Caught Too Many Rats

Space alarms can be set for great sensitivity—or less sensitivity. Rats used to cause alarms until engineers found so many buildings rat-infested that sets had to be adjusted to ignore them.

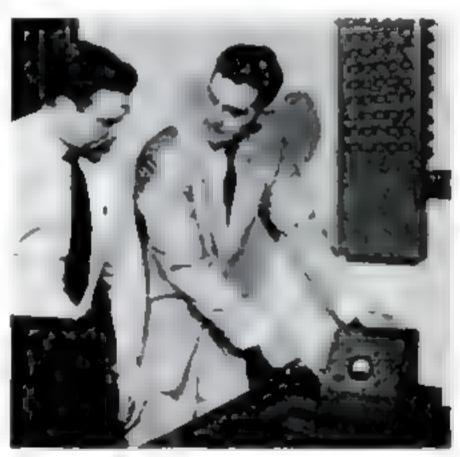
A minister not long ago reluctantly agreed to use a space alarm to catch someone who was stealing the collections.

Twice the alarm went off when children were playing in the parish room. Each time, detectives arrived immediately.

But one day the alarm did catch the burglar—a member of the congregation.



DOME-SHAPED TRANSMITTERS of the ultrasonic alarm system here protect a museum's treasures. Sometimes the transmitters are made to look like molding strips and guard each showcase.



ALARMS YOU CAN HEAR and see come from this box in the detection-agency guardroom when one of a client's ultrasonic receivers signals trouble. Wall panel tells just where the trouble is.

The minister was profoundly distressed but found comfort in philosophy.

"Oh, well," he said, "a congregation is like the River of Life. In every congregation there are a few tadpoles."

Commented a Kidde engineer: "We've caught burglars, bats, rats and kids. But that's the first time we ever caught a tadpole!"

#### Kids' Midget Racer Is Stripped Down

A TEEN-AGER can design his own dream car around this steel chassis. Chain-driven, it has a 2%-hp, rear engine with foot throttle and a geared transmission. Axles are tubular and the one at front has cantilever action for easier riding. Midget Motors Supply, Athens, Ohio, expects the kids' car to sell for around \$200.



#### Dummy Is Crashed To Test Plane Seat

THE dummy at left has just endured a "crash landing" in the National Advisory Committee for Aeronautics' laboratory in Cleveland. His seat is of experimental construction, with inflated back, arms and cushion and no sharp edges. A body striking it would be well cushioned. The seat will not look like this if it is accepted commercially



#### Scalpel Sealed Clean

STERILE scalpel blades now come in sealed foil envelopes. A nurse can peel one open, drop the scalpel onto a sterile surface and fasten it to a handle in seconds. American Safety Razor Corp., 315 Jay St., Brooklyn, N. Y., manufactures them.



#### "Brain" Fits Hand

A TURN of the crank of this circular, hand-held Curta calculator enables you to solve mathematical problems from simple addition to square roots. The Curta Calculator Co. 3851 W. Madison St., Chicago, distributes it.



#### Radio Lights a Path

As an additional selling point for the camper, Phileo has slipped a flashlight into its newest line of portable radios. The business end of it is visible above at the right, Both radio and flashlight operate from two double-size batteries.

# I'd Like to see them make...



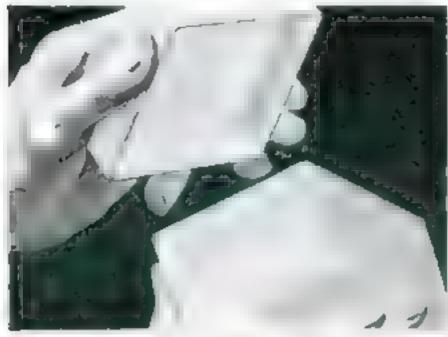
A FURNACE THERMOSTAT with projections on the dial at 60 and 72 degrees so that a near-sighted person could set it just by feel.—Andrew M. Starr, Carmel, Calif.



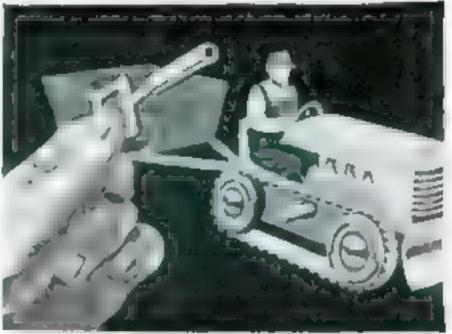
CHRISTMAS-TREE LIGHTS with electric cords covered with glitter. They wouldn't have to be hidden but could be draped like tinsel.—Kaye Denton, Grand Haven, Mich.



A SPECIAL SHANK, one end shaped to fit bit braces, the other square to take sockets. A brace's two-way ratchet action is ideal for wrench use.—R. R. Rundell, Miami.



A PLASTIC LID for quart-size milk cartons. The containers could be cut down and fitted into refrigerator, freezer or lunch box.—Mrs. Wm. Llewellyn, Lonaconung, Md.



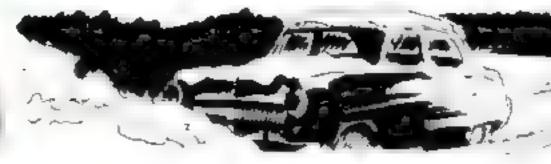
WIND-UP KEYS FOR MECHANICAL TOYS made in a standard size and sold like skate keys. Then a lost key wouldn't put a toy out of action.

—M. Salerno, Brooklyn.

Everyone has his own pet adva of a gadget that he would I ke to see in general use. The five advas cliustrated above were suggested by Post Lan Schwen Vioventa readers. What

in yours? We will pay \$5 for each one published. Please use Government postrards only. Write name and address learly Contributions cannot be acknowledged or returned





The kids would be waiting for him but tonight Gus was miles away, playing real Santa Claus.

#### By Martin Bunn

GUS WILSON was just closing the Model Garage on the evening before Christmas when snow began to fall. The flakes floated slowly down in feathery loveliness. Gus washed up and, drying his work-hardened hands, looked out at the falling whiteness.

"If I had time," he commented to Stan Hicks, "I'd get out there and heave snowballs. As it is, I'd better hustle. I'm booked to be Santa Claus for the kids at the Kipp Street school tonight."

Stan grinned at the thought of Gus dressed up in red pants and white whiskers. At that moment a small, snow-covered car of foreign make turned in from the street and scooted beneath the partly lowered garage door. A pleasant-faced young sailor unfolded himself from behind the wheel,

"Lucky that I got in before you closed," he said. "There's something wrong with this limey heap."

#### Time Out for Sonta

Gus cocked an ear to the roughly idling motor. He hoped that there was nothing seriously wrong, since he would be pinched for time to get ready for his ordeal as Santa Claus, Stan, Gus knew, was shining himself up for a special date.

"Naybe that's all " the sailor said, "but I can't afford to take any chances—not tonight, with the garages closing for



"Look, sailor, I'm stuck here for a couple of hours. I have to do a Santa Claus act . . ."

## into Christmas



Christmas Eve, and me with a hundred miles yet to go. Around midnight I figure to be playing Santa Claus for my kid haven't seen him for a solid year."

Gus nodded sympathetically. "Now

about your trouble."

"I drove this heap right out of a usedcar lot down in the city," the sailor said "Hurry to get home—didn't eat, I nosed down into the curb at the restaurant up the street a couple blocks, and couldn't back out, Only wanted a sandwich Guess I never had the car in reverse before."

"Couldn't back out from the curb!" Gus exclaimed, "Do you mean to say that someone sold you a car that won't

go in reverse?"

"Right," the sailor said. "Doesn't have enough poop to back away from the curb. Restaurant fellow helped me push her back into the street so I could get going forward."

## Little Car Behaves Perfectly

Gus got in the car, a tiny imported sedan, put it in reverse and backed it up smartly. He ran it back and forth A foolish look came into the sailor's eyes. "Seems all right now," he said

"Maybe I'd better shove off."

Urgently wanting to close up, Gus had half a mind to let him go. After all he told himself, this motor had less than 40 horsepower, and that street at the restaurant was high-crowned. It would take power to back from the curb there. But the brakes felt as if they'd been set up a little too snug. And that rough idle sounded as if one plug was cutting out. Gus thrust his heavy shoulders be-



"Just didn't know anyone else to call, Mr. W ilson. I was hoping maybe I'd be home by midnight . . ."

neath the hood, ran his screwdriver over the plugs, located the weak sister and replaced it with a new one. Then he cleaned and set the others, checked the points and gave the idling screw a quarter turn.

### Gus Euses the Brakes

Working with calm speed, Gus raised each end of the car with the floor jack; the rear brakes were dragging a bit, and he backed them off. He put a hand to the brake pedal, to check floorboard

clearance and stroke length, He started the motor, listened to it approvingly, ran the car back and forth a few times on the garage floor.

"You can roll now, sailor," he said. "Take that hundred miles easy. Never mind the pay. Just call it from one Santa to another."

"Thanks a million, pal," the sailor said.

"And Merry Christmas, too!"

Looking after him, a sense of unease came to Gus, but he shrugged it off. He went down the street to the restaurant and ordered a double hamburger.

"You been working late, Gus?" the

proprietor indurreds.3

"Yeah, Had a last-minute customer, A sailor with a little foreign car, Did you-see him?"

"Sure, That car wouldn't pull the hat off your head. I had to help push the thing away from the curb."

"That's what he told me," Gus said.
"I wonder how a man feels when he hasn't seen his wife and kid for a whole year."

An hour later, dressed in his Santa Claus outfit, Gus was watching the kids put on the school pageant. He stood far back in the rear, where the kids couldn't see him. His enjoyment of the show was mildly shadowed by nervousness over the Santa Claus act. Thing to remember, he told himself, was to say Ho! Ho! Ho! every now and then. He was worrying

the thought when Miss Davidson, one of the teachers, touched his elbow.

"You're wanted on the phone, Gus," she whispered.

Gus walked into a side room and

picked up the phone.

"Hello," a worned voice said over the wire, "I've had a time getting you. Fellow at the diner said you'd be at the school now. I'm Jimmie Wilder—the sailor with the little car. I missed a turn out here, I'm not ditched or stuck—just can't back up. I'm phoning from the

Sam Reynolds farm."

Glancing at his wrist watch, Gus felt a sinking sensation. The Reynolds farm was several miles out, and in 45 minutes he had to be up on the stage.

"Look, sailor," Gus said desperately. "I'm stuck here for a couple of hours. I have to do a Santa Claus act at

the school, and I'm due on soon."

"You would have to open your big mouth

and ask if anyone wanted a lift home!"

"Just didn't know anyone else to call," Wilder said, an infinite weariness in his voice. "I was hoping maybe I'd be home by midnight . . ."



Gus was mentally flaying himself. He knew, right down in whatever prompts a mechanic's hunches, that an erratic spark plug and slightly dragging rear brakes shouldn't have stopped that car from backing from the curb.

"Stay where you are, Wilder," he said

into the phone. "I'll be right out."

As Gus pulled away from the school, his tires throwing snow and gravel, he caught a glimpse of the worried face of Miss Davidson looking after him from the school door. Gus made fast time. As he wheeled into the Reynolds yard, the sailor ran down the farmhouse steps to meet him.

"Good going, mister," he breathed.
"I'm about a mile down the road. Took
the wrong turn. Trees and brush. Can't

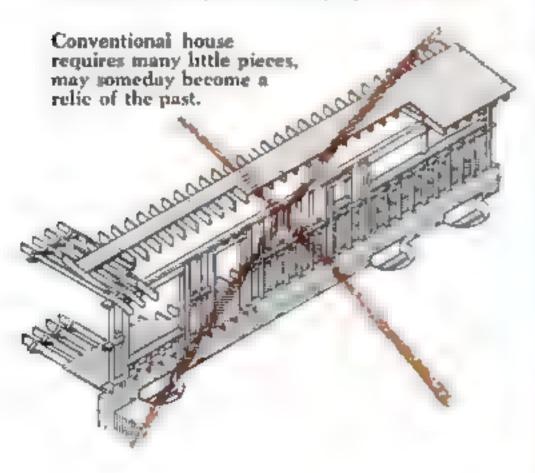
[Continued on page 230]

# The 'Big Piece' Way to Build

Fewer parts for fewer workmen now make building garages or mansions faster—and cheaper.

## By John L. Springer

REMEMBER the high, open ceilings and big exposed beams popular in Great-granddad's time? Now many architects are going back and adapting similar construction features to today's houses. The results are sleek, modern homes that cost less to build, go up faster, take fewer workmen and permit many special effects







LIGHTWEIGHT "CURTAIN" WALLS on this summer cabin at Fishkill, N. Y. (also shown on opposite page) support no load at all, are simply strung between heavy 4"-by-6" vertical posts set wide apart. Walls don't even touch floor, as you can see by the water-drainage crack that separates porch from cabin's interior.



ROOF RAFTERS rest on 4"-by-12" girders that span full distance between cabin's vertical posts from front to back. Underside of roof sheathing provides rustic ceiling with no further finishing, saves on both work and materials. Design is also ideal for an added-on den, playroom or other informal room. By using sturdy 2" tongue-and-groove planks for roof, you get a ready-made sun deck of tremendous strength to top off a garage or porch

not possible with conventional construction.

Called plank-and-beam, the system requires bigger pieces of lumber but a lot fewer of them, and the same timbers serve both as structural members and the finished surface. Instead of the usual two-by-eight floor joists set 16" apart, the plank-and-beam house may have three-by-ten beams 6' apart, Instead of 1" of subflooring and another 3" of finish flooring, wide tongue-and-groove planks 2" thick may serve as both rough and finish flooring in one.

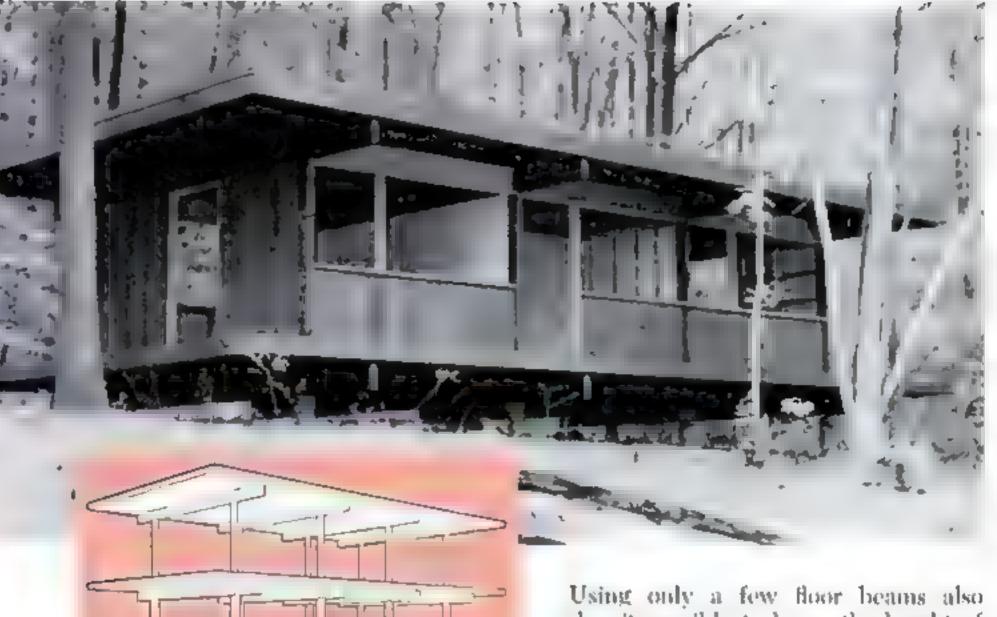
Roofs are framed the same way, Rafters are left exposed, and the roof sheathing becomes the finished ceiling, Roof loads are concentrated on heavy columns spaced wide apart so that you can put large picture windows almost anywhere without costly extra framing to span the gaps.

Small jobs are easier, too. Besides complete houses, the plank-and-beam method is ideal for weekend cabins and other small construction jobs, making it easier for homeowners to do the work themselves.

Because you have fewer pieces to handle, you can put up a small cabin or build on a house extension without the endless fuss of cutting, fitting, aligning and nailing a lot of little pieces. Adding a carport is a simple matter of extending the house roof out over three or four husky posts set in the ground. Later, if you want to enclose it to make a full garage, light "curtain" walls can be strung between the existing posts without requiring their own foundations or affecting the structure at all,

Dramatic broad-windowed sunrooms and open-view porches are also a cinch since there are few structural members to get in the way. It's the nearest thing to hanging a roof from skyhooks and leaving out the walls entirely.

Wood must be good. With fewer pieces to rely on, each one has to be top grade. Planks and beams must be well milled, well seasoned and straight. When these are delivered to the job site, they are stacked off the ground and put



wint picture windows are easy, since non-load-bearing walls can be unitted wherever openings are desired. Entire roof load is supported on only eight posts set directly over corresponding concrete piers sunk in ground (sketch) Using piers saves back-breaking work (and budget-breaking cost) of full formulation

under cover to protect them from the weather.

As soon as possible after delivery, and before erection, they get at least a prime coat of finish to retard moisture. Many builders using stain or shellae do the complete job on the ground. When the carpenters nail the planks in place, they're already finished

It is also important, for appearance to have ceiling joints straight and usually parallel to the room walls. You must make sure that planks are straight and true to a line perpendicular to the beam.

Big pieces save money. While lumber costs more per piece, using fewer pieces saves on the total cost of material and labor. By eliminating the ceiling, in effect, you also avoid the cost of ceiling joists, bridging, lath and plaster

Using only a few floor beams also makes it possible to lower the height of basements. Alan L. Winthrop, project engineer of the Division of Housing Research of the Federal Housing and Home Finance Agency, estimated that in a house 24' wide by 40' long, the saving in basement construction amounts to at least 85 square feet of foundation wall, 30 cubic yards of excavation and 9% yards of cement coating and waterproofing.

Using widely spaced ceiling beams, you can get an 8' ceiling height although your wall studs are only 7' high. You can make full use of stock 14' lengths.

The National Lumber Manufacturers Association compared the cost of a plank-and-beam floor using 6' spans with that of a conventional floor, both built by the same workmen under identical conditions near Washington, D. C

The plank-and-beam method saved 14.7 percent in lumber and 26.3 in carpenters' time

"Savings would have been increased if larger plank spans had been used and if carpenters had been as experienced with plank-and-beam construction as with joisted construction," Mr. Winthrop says.

New insulating tricks needed. Even enthusiastic supporters of the plank-and-

beam method warn that it is no miracle formula, however. Open ceilings make it necessary to insulate and wire differently than you would in ordinary construction. Insulating effectively is difficult in areas where winters are severe, and for this reason the method has so far been used mainly in the South and West.

Plank-and-beam builders generally use insulating materials over the roof planking. These are the rigid type which can bear the weight of the men applying the roofing, the roofing itself and the snow

OUTSIDE ROOFING INSULATION ROOF DECK ROOM OUTSIDE ROOFING INSULATION VAPOR BARRIER ROOF DECK ROOM OUTSIDE ROOFING INSULATION VAPOR BARRIER ROOF DECK VAPOR BARRIER ROOM

PUTTING INSULATION on outside of roof makes moisture control a must. Roof at top will soon rot, as vapor has condensed against cold outer surface and been trapped inside. Adding vapor barrier between planks and insulation (center) keeps vapor from insulation, but may let it condense in wood if barrier gets cold enough. Safest bet is barrier on both sides of planks (bottom), which keeps moisture from reaching both wood and insulation.

ISS POPULAR SCIENCE

load without crushing or breaking, and they keep their insulating properties even when slightly wet.

Condensation in a plank-and-beam roof can cause rotting planks, peeling paint or a blistered, leaking roof. Careful condensation controls must be built in.

While some types of insulation need no separate vapor barrier because they are impervious to moisture, a vapor barrier installed over the planking and under the insulation will lower the chance of any low-viscosity mastic penetrating and

staining the planks.

Where to hide the wires? "You must decide how to handle the electrical distribution system before beginning actual construction of a plank-and-beam house," Mr. Winthrop says. "There is no concealed ceiling space in the open-roof system in which to run the wires, and there will be no floor-joist space for electric cables if you use a concrete slab."

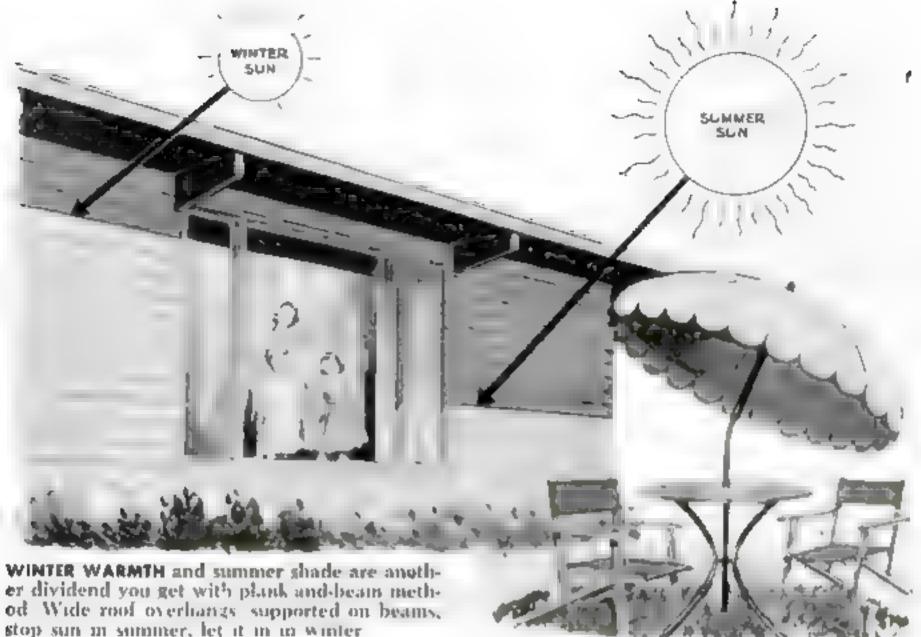
Some builders eliminate ceiling fixtures wherever possible and use wall fixtures instead. Others use ceiling fixtures fed by wiring in small, trim metal raceways or in built-up beams composed of two 2"-wide members separated by spacer blocks.

Plug-in strip molding or other surfacemounted raceways are used to feed wall outlets. The molding strip then becomes part of the trim.

As in conventional construction, the size and number of beams and posts de-

ROOF can be conventional peak, but is often kept flat or shallow-pitched because of simpler framing. Where shingles won't shed, as here, built-up top of tar and slag is used.





pends upon load requirements and local building regulations. Single beams, however, are rarely less than 3" thick and, posts are usually at least 4"-by-4".

Summer cabins are a cinch. Architect Edward L. Barnes of New York used the plank-and-beam method in half a dozen cabins at the summer camp of the New York Herald-Tribune Fresh Air Fund at Fishkill, N. Y. The cabins are built on round, steel-reinforced concrete piers 8" in diameter.

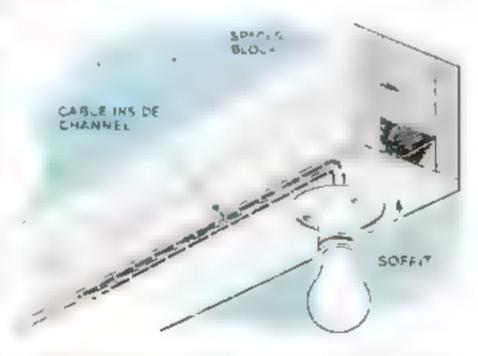
Barnes strapped 20'-long four-bytwelves to the piers to span the width and give a cantilever of 43" on each side. Walls were placed directly over the line of piers, and the cantilevered sections served as porches. Dimensions of the cabins, including verandas, measured 20' by 38' 3",

Perpendicular to the beams, Barnes placed two-by-sixes 16" on centers and above them one-by-four tongue-andgroove flooring. All lumber was treated with termite-resistant stain before being put into place.

Four-by-six posts were set directly on the floor beams over the concrete piers

to support four-by-twelve roof beams covered with one-by-six tongue-andgroove sheathing.

Whether adapted for gabins or yearround homes, the plank-and-beam method requires careful selection and cutting of the materials. But once you have them, you can reap big savings in money and time when you put the pieces together. END



HOLLOW-CORE BEAMS can be made up to hide electric cables inside by nading two planks together with spacer blocks in between. The exposed channel is then covered by a soffit, a thin board nailed across the bottom, which gives the look of a single, solid beam.

USING METAL AND WOOD, IT'S EASY TO BUILD

## Modern Accessories for A Modern Home

By Mac L. Olds

NO NEED to mortgage your future to go modern. Look what you can do with simple wooden shapes and handbent metal legs. Any of these items can be made in an evening or two.

Even construction lumber can be used of you finish with lacquer or enamel. If you want grain to show, choose wood that will take a nice natural finish.

Sand wooden parts and fill any defects. Seal with shellac, Finish with more shellac, lacquer, paint or enamel, For spatter effects, load a brush with a second color and tap it above the piece.

Steel, brass or aluminum rod can be used for the legs. Finish steel or aluminum with flat colors, Polish brass with steel wool and apply clear lacquer.

If you cannot get rubber feet, use push-on pencil crasers, drill bits of dowel to fit the rod, or cement on rubber tubing to project past the ends.



## WATERPROOF PLANTER

Its liner is a 5%"-by-9%" aluminim bread pair. Make a box of 1" lumber to fit it and be about 4%" deep. Butt, rabbet or miter the corners. Assemble with glue and 4d, finishing nails. Spot these at outer corners only. Cut %"-deep decorative grooves on the circular saw after the box is put together, but take care to miss the nails.

The legs are 14" lengths of 4" rod, with 4" of each end bent to 60°. Drill holes for No. 4 wood screws at the center and in each bent end. Paint legs and liner the same color

## CERAMIC-TILE LAMP

ONE or two 6" ceramic tiles will set the decorative theme for a stumming lamp. Square up an 8" or 9" block of 3" lumber. Rout or clusel a 4" recess in one or both faces for the tile.

Drill a %" hole through for a piece of fixture pipe to hold the socket. Finish the block before cementing the tile in. Bend 2" legs on 10" lengths of %" rod to 80°. Attach each of the leg members with three screws.

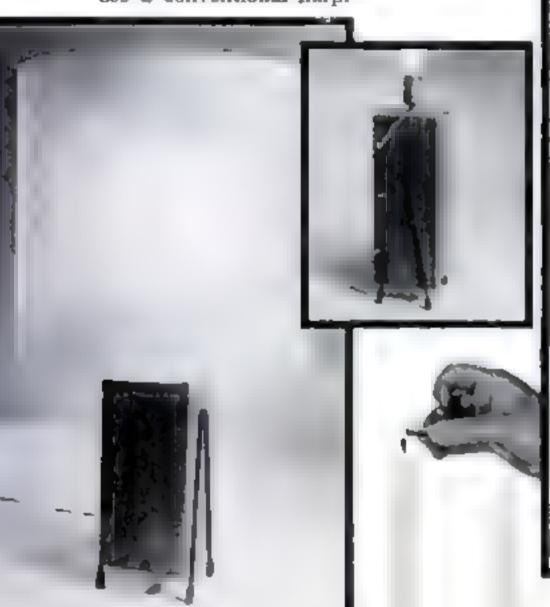


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## CEDAR-BLOCK LAMP

SLEEK and simple, this lamp is a oneevening job. The base is a 5"-by 5" block of cedar 12" high, Bore lengthwise for the cord, opening the hole at the top to a tight screw fit for a %" pipe nipple. Finish with linseed oil or wax.

Bend the legs from %" rod as shown in a photo on the next page. Attach with two No. 4 screws apiece. The shade holder shown was made by spot-welding four wires to a washer. You can salvage a like one from an old lamp shade, or use a conventional harp.



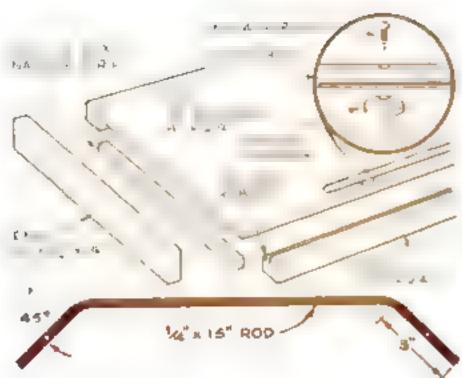


THREE-LIGHT CAMDELARMA

CANDLES go modern in these updated holders. Saw the long one from 3" stock 14" long, making the curve of 14" radius and 3" deep, Bore X" holes 1" deep for the candles. Bend 14" lengths of X" rod to 120° and attach with small screws, making certain all four feet touch.

Lay out the triangular holder on two-bysix stock, rounding the sides to a 12" radius as in the drawing. Use a string tacked to a block if you haven't a compass big enough. Legs are 16" lengths bent 90°. Holder shown is charcoal gray, spattered with yellow.





LIGHTWEIGHT TRAY

ROOMY and easy to carry, this tray is made of %" plywood with a frame around it. Rabbet two edge strips %" deep and glue them to the long sides. Glue \u21e4"-square strips under each end. When these have set, glue and screw on the



TO ATTACH THE LEGS with ample finger space under the handle rails, place the tray upside down on 1" blocks like this. Let the handle part rest on the work surface.

14"-wide endpieces. Sand and apply an easily washable finish.

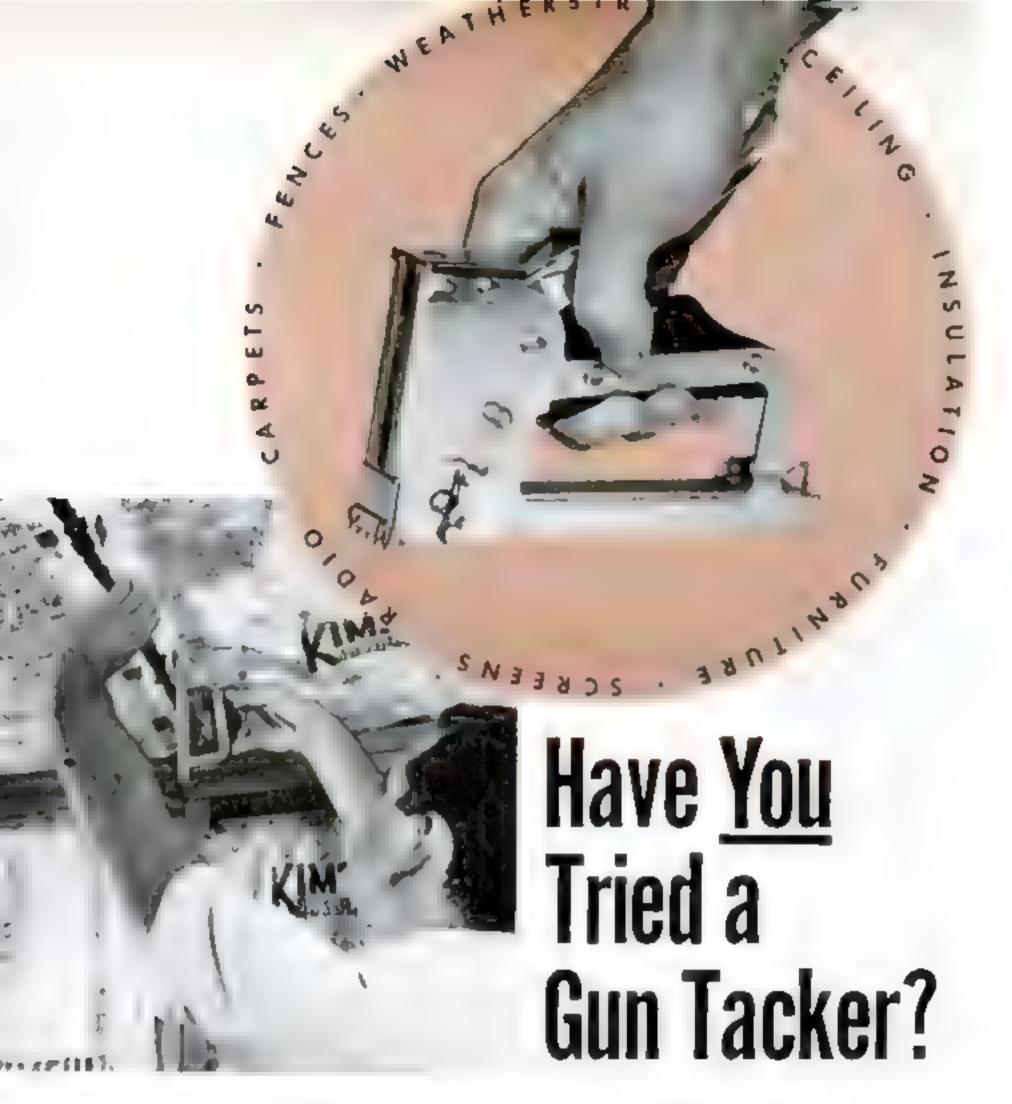
Bend 3" rod to form feet as shown. Attach these and side rails with No. 4 screws. Put faucet washers under the side rails as spacers.



## **HOW TO BEND LEGS**

Two pieces of %" pipe make it easy to bend metal rod. For obtuse or right-angle bends, clamp one pipe in a vise as in the left-hand photo. To make acute-angle bends, mark the center of the length of rod. Slip both the pipes on up to, or the same distance from the mark. Shape with both hands as shown.

ISD POPULAR SCIENCE



Now a workshop tool of many uses, the desk stapler's big brother is a modern substitute for your hammer.

## By Jerry Parker

USING a builder's stapler, you can drive 10 staples in the time it takes to hammer one nail. This is the big reason why so many homeowners are turning to staplers, better known as gun tackers.

You need no skill to get professional results in any of the many jobs a tacker

will do-installing insulation, making screens, and applying building paper, roofing felt and upholstery, to mention just a few.

The gun tacker's little brother, the common desk stapler, is also filling in at an increasing number of how-to jobs. If the hep handy man has a gun tacker in his toolbox, he's likely to have a small stapler in his second arsenal, the kitchen



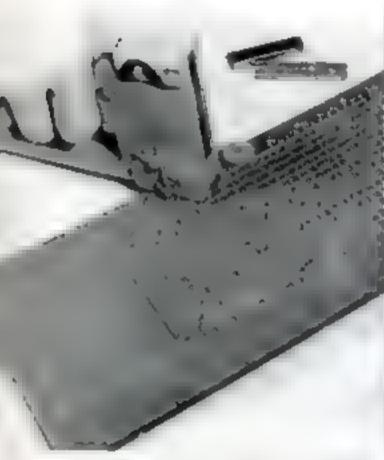
of abrusive paper around a wood block; staple it in place



ANCHOR CARPETS, especially ones that slip. Also rug pads, stair treads, loose linoleum.



INSTALL FAKE GLASS, Stapling is easiest way of fastering plastic used as glass substitute.



FASTEN RADIO GRILLE. \ tacker can expedite countless jobs like this in the home and sliop



UPHOLSTER FURNITURE, Turn over a cushion like this results will look professional



TACK WEATHER STRIP. This makes it unnecessary to struggle with a binning and tacks.

BUILD FENCES Pourtey raisers have found it's easier to fasten chicken wire using a tacker



REPAIR FURNITURE. It a no troutile at all to staple new canyas covers on outdoor furniture









Ceiling tiles go up faster, and usually at less cost, with a tacker than with clips or mastic.

drawer, where his wife will find it mighty handy, too.

Most versatile of the little staplers is any model that may be unslung from its base and used as a light tacker. The little stapler can do such things as make paper or cardboard toys and decorations, repair window shades, fasten flower arrangements, attach shoe bags to closet doors and fasten material in place on valance frames

### It Works Like a Semiautomatic Rufle

Using a gun tucker is no more complicated than manipulating a little stapler. The tacker is operated with a squeeze of the fist. A powerful spring, tightened and released as the trigger is bent toward the handle, propels a plunger knife. The knife drives the staples. You can shoot staples as fast as you can pull the trigger.

Each model takes several different staple sizes. The staples, averaging around five cents a bundred, are made of heavy wire and are in the traditional U shape, with a 3" crown on most types. Staple legs vary in length from 3" to 9/16".

Staples are cemented together in long

**SWUNG LIKE A HAMMER**, a stapling hammer is the big member of the stapler family. It will do almost all the jobs of a gun tacker and is easier to use in some instances. It automatically drives a ¾ " staple with every whack.



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strips and are loaded in strips. Staple legs toe in or out as they enter any material to give a better hold. Rosin-coated staples, which have double holding power, are available, as are galvanized staples.

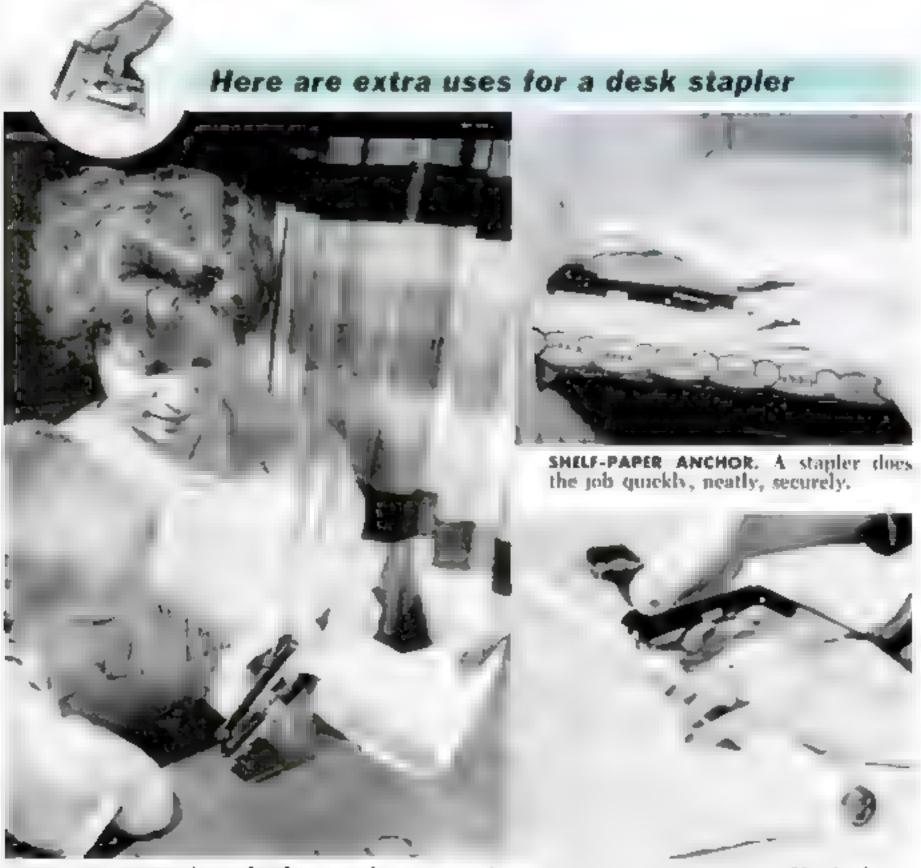
It takes longer staples, of course, to hold up ceiling tiles than it does to fasten insulation. Staples 9/16" long and rosin-coated are recommended for tiles, while "" staples are suitable for almost any insulation.

## How to Pick the Right Staples

Screening and building paper may also be held with X" staples. One staple manufacturer offers this rule of thumb: measure the thickness of the material to be fastened and allow approximately 3/16" for penetrating the wood or other surface.

Big brother of the gun tacker is the stapling hammer, or hammer tacker. This tool, which looks something like a hammer and is swung like one, delivers a %" staple, the biggest used outside of industry. Shingles held by staples are tighter than those held by roofing nails and they will not come off even in a hurricane.

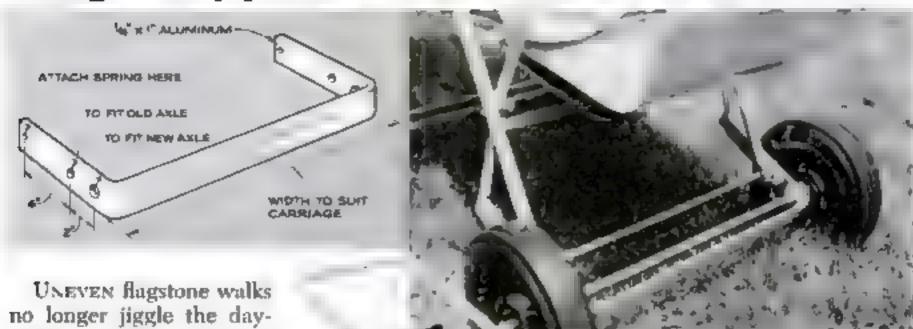
A small stapler-tacker suitable for household jobs costs around \$3. A gun tacker capable of driving staples up to %" may be bought for \$10. If you need a trial to be convinced of their worth, tackers are available for rental from many neighborhood hardware dealers or lumberyards.



RAINY-DAY 70YS. A stapler has saved many a rainy day by creating novelties, like this hat, for the kids.

WINDOW-SHADE TACKER. Use it also to mend torn Venetian-blind tapes.

## Youngster Enjoys a Smooth Ride in Knee-Action Stroller



UNEVEN flagstone walks no longer jiggle the daylights out of our baby daughter when she goes out in the stroller. It now has balloon tires, larger wheels and a knee-action type of spring suspension, all of which I added.

The wheels and tires, about 8" in diameter, were obtained by mail order. A 60" length of \$"-by-1" aluminum bar, \$" steel rod to make an axle for the wheels, four tension springs with a 15-lb, pull, washers and cotter pins came from the local hardware store

The old small wheels were removed and the axles hacksawed off to leave a stub extending about X" beyond the frame on each side. With a hole drilled near the end for cotter pms, these stubs serve as pivots for a new axle-

mounting bar shaped from the aluminum strip.

Springs run from the ends of the two nxle bars to convenient spots on the stroller

the aluminum frame. The springs were selected and posi-

frame. The springs were selected and positioned so that the axle-mounting bars are almost horizontal under load.—Leo H. Kanerca, New Rochelle, N.Y.

## Limit String Will Keep Drawer from Spilling Its Contents

SMALL drawers that slip out too far and spill their contents can be tethered this way. Fasten a string or tape to the inside of the drawer back and tack the other end to the frame a little more than halfway back. Adjust the length so that it just lets the drawer open fully without falling out. If the drawer isn't low enough to clear the tack head inside, cut a small notch in the back.—Walter E. Burton, Akron, Ohio



## How to Put Your Home on a Christmas Card



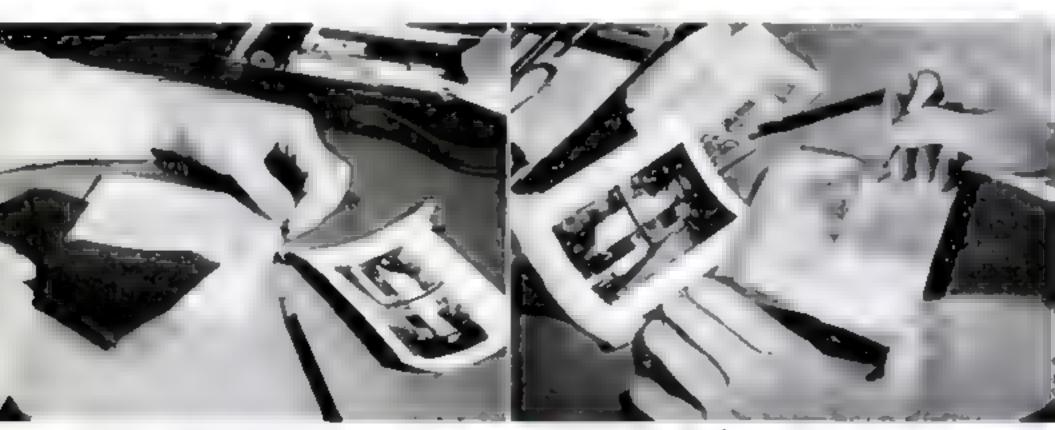


1 TAPE TRACING PAPER over the photo so that it cannot move. With a pencil, outline the main masses such as trees, houses, fences, roadways and so forth. Pencil in such features as door and window panels, but don't worry about any smaller details. The kit, shown at top of this page, includes everything you need except the photo of your house.

Using a new block-printing kit, you'll find it easy to reproduce a sketch traced from a photo.

JUST picture your house on this year's Christmas cards, Look good to you? You can do it with a new method of block printing. From a photo of the house you can trace a block to print Christmas cards, book plates, announcements or invitations by the dozen. Of course, other pictures can be used, too.

No artistic talent is necessary. By following the steps shown, you will get a rendering similar to an etching. All the materials can be bought as a kit from local art and department stores or from the makers, Bassons Industries Corp 1432 West Farms Rd., New York 60, N.Y.



TURN TRACING OVER and tape upside down to plastic-coated block. Slip carbon paper between. Go over back of lines to transfer reversed tracing to the block. If lines can't be seen, lay tracing face up on black side of carbon and trace over, transferring them to the back. Retrace on block with back side up.

3 Scratches will print white; the deeper the scratch, the wider the white line. For solid black, leave surface untouched. Crosshatching or parallel lines give gray tones. Refer to photo often, but don't try to add every detail. Blow off dust from the block as you work.

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Trim prints with a narrow black margin all around and paste them on eard stock or folders.



4 NAME OR GREETING must be written mirfor-backwards on block. Write it on paper laid on face-up carbon. Flip paper over to trace reversed writing on block, and scratch it out. Dab ink on plastic sheet provided. Spread with roller, then run inked roller over the block, depositing an even coat of ink.

DROP PRINTING PAPER straight down on inked block so that it does not slide and smudge. Rub back of paper tirmly all over with heel of hand or wad of soft cloth until mage appears faintly. Peel off with two hands as above. Re-mk block with roller for each print. Let prints dry an hour before stacking.



SEVEL CUTS are as simple as straight ones with this new saber-saw attachment. The tilt-arbor control swings the saber blade to the desired angle. Big work is easy to handle because the table provides generous support.

## Jigsaw Attachment Cuts Curves on Circular Saw

Saber blades let you use the full table, with no arm to restrict swing of big work.

IN MINUTES, an unusual accessory converts a popular 8" tilting-arbor saw into a husky saber saw. Taking over where the round blade leaves off, it will cut flowing contours or intricate curves in stock up to 2%" thick. With sanding strips or files in the saw chuck, it will smooth and finish wood or metal.

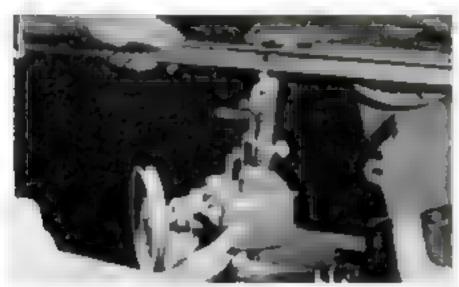
The fence and mater gauge being removed, the entire saw table is available to support large pieces. Since the stiff blade



requires no backing above the table, there is no over-arm, and work of any size can be swung completely around. For inside cuts a hole is drilled and the work simply dropped over the blade.

Mounted on the heavy round bars that form the tilting-arbor and motor-support frame, the attachment tilts just like the regular blade, the same tilt-adjustment knob being used. Precise bevel cuts are therefore possible

Running in bronze bushings, the shaft is fitted with a 5" pulley that reduces motor speed to about 1,500 strokes a minute. The reciprocating mechanism runs in an oil bath. With two saber blades, wrench, extra blade support and a special table insert, the attachment is priced at about \$15. It is made by the Rockwell Mfg. Co., 436 N. Lexington Ave., Pittsburgh 8, and it will fit any 8" Delta tilting-arbor saw, old or new.



ARBOR IS TILTED for installation of the unit, which takes only a few minutes. The box-like housing fits under two horizontal shafts that comprise the tilt-arbor frame. Two small rectangular bars are then slipped into slots in the housing, above the frame shafts, and are clamped against these with screws.



CIRCULAR SAW BLADE is removed. The belt is run on the arbor pulley and along the top of the pulley on the saber-saw attachment to drive it. Finger-locking vise-type chuck holds blade by its lower end only. A slotted bracket supports blade below the table. Chuck will also hold sanding and filing tools.

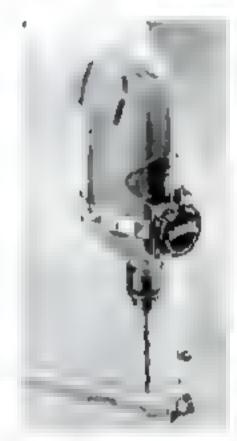




1. Plate Guides Plane. A pivoted plate that can be clamped to the side of an or dinary plane keeps the blade at any desired angle to the face of the work. By guiding against the plate, jointing, squaring and beveling can be done more accurately.



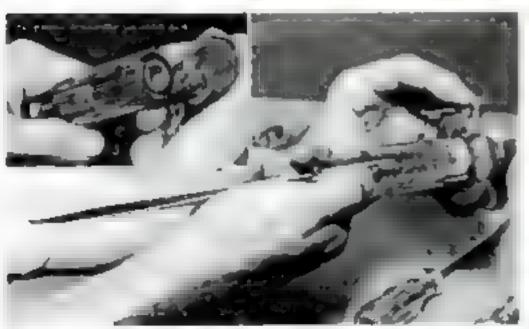
2. Tiny Power Tools Do Everything. Parts for models can be turned out easily on these tiny motor-driven tools. The table-top workshop includes a real tilting-arbor saw, a lathe, a drill press and a jigsaw.



3. Gauge Aligns Drill. Clamped to an electric drill, this device helps hold the bit square to the work. When three points on the foot all bear on the surface, the drill is straight. Drilling depth is read on the graduated shaft. The gauge can also be set to work on angle jobs and on curved surfaces like boat hulls It is easy to attach and to adjust.



4. Probe Spotlights Work. Useful as a flashlight by itself, this inspection light has a detachable plastic probe and angle mirror. The probe pipes illumination to its tip. while the magnifying mirror turns corners to reflect hidden areas.



5. Handle is a Ratchet. This knobshaped ratchet head snaps onto 40 different tools, including various kinds of screwdrivers and socket adapters. Its large grip gives extra torque with less effort than conventional handles. and the knob can be reversed to operate in either direction with a flick of your finger.

Farther information about the tools shown on this page can be obtained from: I Persone Co. Hurrison V F : 2. Dynamic Decices, Inc., 125 Sunrise Pl., Day tan, Ohio; J. High Standard Mig. Corp., Humden. Councy 4. Moore Mig. Co., Swedesboro, N. 1; S. Kipton Industries, Inc., Kipton, Ohio.



## New Hardware Speeds Furniture Building

These tricky gadgets and prefab parts let you make fancy pieces without fancy price tags. Equipment needed: just a screwdriver.

## By Sheldon M. Gallager

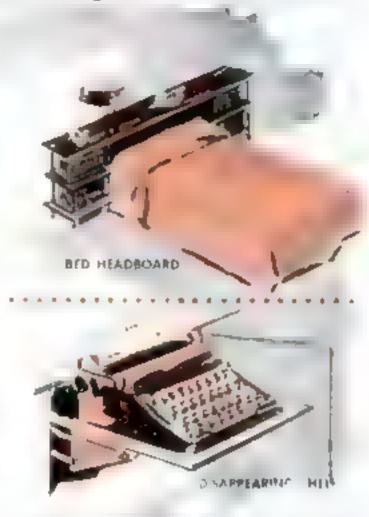
EVER looked longingly at some gleaning wrought-iron furniture piece and wished: "If I could only weld"? Or eyed some fancy revolving kitchen shelf and thought: "I could build that easily if I just had the little special piece of hardware that makes it go around"?

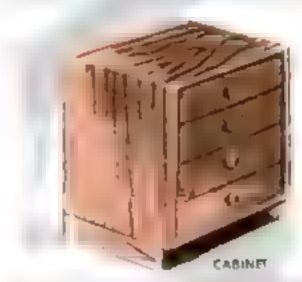
Now you can do these things yourself, and many more. New furniture-building hardware and prefab parts let you create eye-catching effects formerly found only in costly custom jobs.

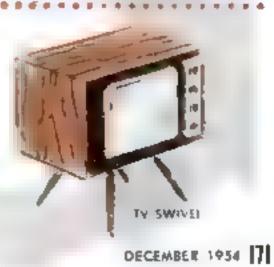
Putting the parts together yourself means you get exactly what you want. You don't have to shop around for a bookcase to fit a particular spot—you make it to fit. Using identical parts, you can combine them into any type of furniture you want. A board with legs makes a table—a whole room divider can be just a lot of tables stacked on top of each other.

On this and the following four pages you'll find many tricky, where-do-you-ever-find-them gadgets that make furniture building a dream job instead of a drudge.









## Here are four ways to put legs on furniture quickly

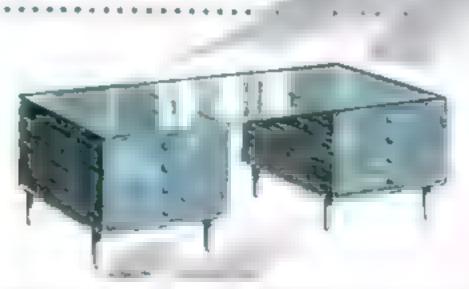


MARDWOOD LEGS take only seconds to put on or take off. A wood block containing a threaded metal socket is screwed to the underside; then a stud in the top of the leg is screwed into the socket. Available from Country Workshop, 95 Rome St., Newark, N. J., they come in six lengths from 6" to 29", and with blocks for vertical or flared mounting.

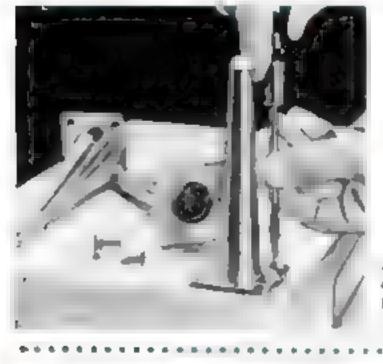


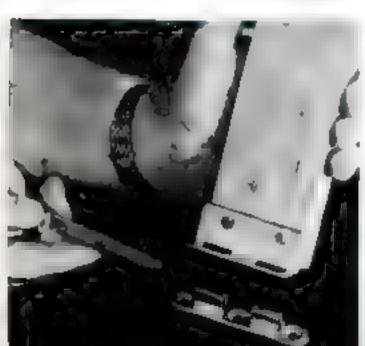


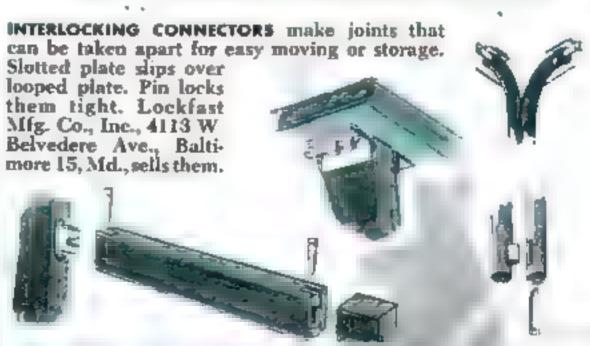
FANCY TABLES made of glass, marble and other hard-to-mount materials are easy with these clamp-on metal legs. You simply tighten a single setscrew at each corner. without drilling or marring the table top. Sold by Simon's Hardware, Inc., 421 3rd Ave., NYC, the metal legs come in several lengths and in two different styles for either square or round tables.



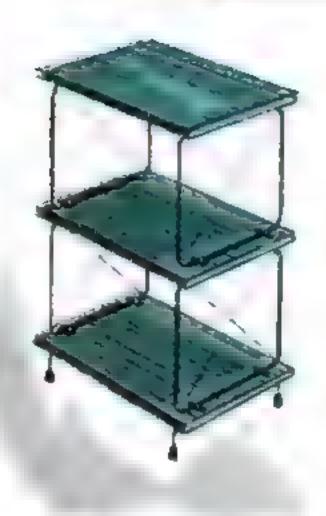
STUBBY BRASS LEGS have a rich, solid look, are made especially for modern sofas, radio consoles and other furniture that needs short, sturdy legs. Also available from Simon's (see above), they come in several lengths.







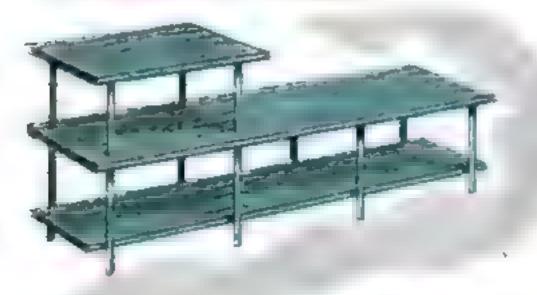
## Stacked units build many shapes and sizes



AND SPACERS will build anything from a single bookshelf to an entire storage wall just by the way you arrange them. Spacers are 8" wide by 11" high, legs 2%" high. Sold by Anchor Sales Corp., 350 37th St., Brooklyn, N. Y., they're simply screwed to one-by-ten or two-by-ten planks to make completed units requiring only finishing.



SHELVES AND TABLES of any size are easy with these hardwood dowels, since you cut the boards first, then just attach the dowels at the edges to space them apart. Three lengths of dowels—3½", 10" and 13"—permit any combination of levels and are punned together by metal brackets that serew to the boards. Available from John Clark Brown, Inc., 1 Montgomery St., Belleville, N.J., the dowels can also be joined to form straight legs.





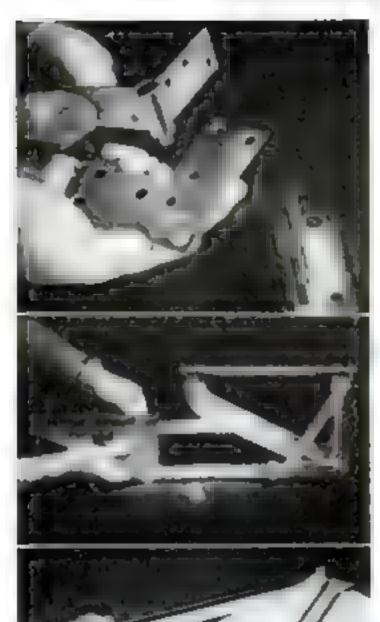


METAL FRAMES can be grouped to make tables or stacked to lorm stepped shelves and room dividers. All you do 'is 'Me squares of 14" plywood or other material into angle-iron tops. Frames, made by Hodor Furniture and Furniture-in-Parts, Me-Carter Highway and Raymond Blvd., Newark. N. J., can be stacked easily. (Please turn the page.)

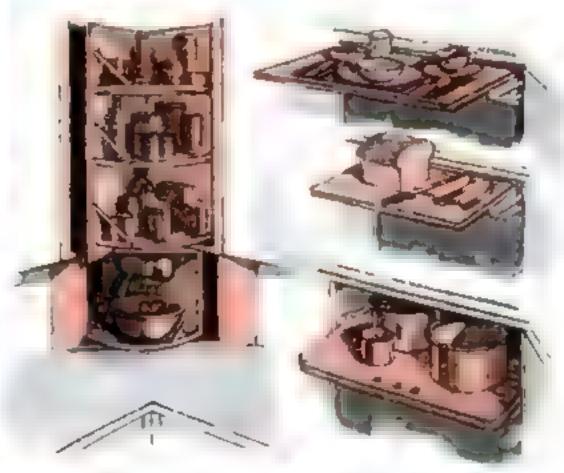


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## Trick shelves spin, slide or disappear



REVOLVING SHELVES for kitchen corner cabinets or other hard-to-reach spots are quickly made with only two of the corner brackets and pivot plates at top left. Brackets, screwed to two vertical boards, hold the boards at right angles and provide top and bottom pivots that fit sockets in the base plates screwed to the cabinet frame. Similar unit (at right in same photo) makes straight-backed shelf. Disappearing shelf brackets (center left) keep everything from a typewriter to a snack bar hidden neatly away, yet spring instantly out for use. Brackets are screwed under existing shelf or counter up to 36" apart. At bottom left, inexpensive metal channels make it easy to mount sliding shelves in deep cabinets so you can pull them out to reach supplies stored in back. Channels are screwed to cabinet sides, and shelves up to "4" are just slipped in. All shelf hardware shown here is made by Washington Steel Products, Inc., 1940 E. 11th St., Tacoma, Wash.







YOU CAN MAKE YOUR OWN revolving stools, chairs and other furniture with this ball-bearing swivel. You just add a seat or table for the top and four legs, which fit into sockets that hold



them at the correct angle. Made by the Reflectone Corp., Stamford, Conn., the swivel will safely support such loads as a revolving TV set or marble coffee-table top.

## Plastic drawers dress up simple cabinets



PREFAS DRAWERS, made of gleaming-black molded Bakelite, take the fancky work out of cabinetmaking—all you do is build a simple box around them. The twin sectional units above have four drawers each, are made with detachable toe-recess bases so that as storage needs change they can be stacked to make a tall chest grouped side by side, or used individually. The plastic drawers, available from the Boonton Molding Co., Boonton, N.J., are 17" wide, 15" deep, and 4%; "high, They are scanless.

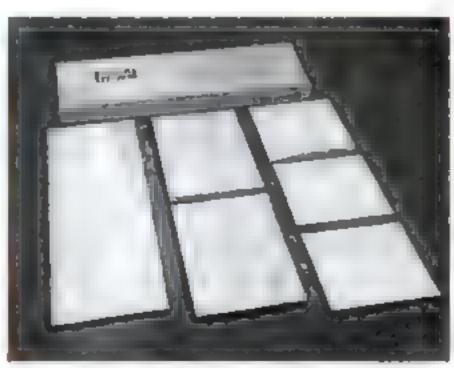
fancy knoss, available at bardware stores in a variety of show metals, are easily bolted to drawers by drilling a single hole through each front. To guide drawers, all you need are pairs of thin lattice strips tacked made cabinet and set %" apart to engage lips on drawer edges. Cabinets here, made of %" plywood, are 19%, " high, 17%," wide, and 16" deep. Drawers are interchangeable



## Hardwood kits make a whole roomful of furniture



WIDE HARDWOOD PANELS come already edgeglued and surfaced in these kits, saving joining and finishing small boards yourself. The panels can be cut as desired or used as they are to make tables, shelves and cabinets without even



sawing the parts. Sold by the Shreveport Lumber Sales Co., 1166 Louisiana Ave., Shreveport, La., panels are kiln-dried red gum 25/32" thick. They come in 12", 16" and 22" widths and in lengths from 12" to 48".

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For the best in basketball photos, take a tip from an expert. It pays, he says, to

## Shoot from the Basket

## By Dave Stanley

IF YOU, as an amateur photographer, want to shoot basketball pictures, come early and grab yourself a seat alongside the basket, or as close as possible. There, most of the action comes right up to you. Trigger finger ready, you wait to capture such shots as spills, fast-breaking lay-ups and the facial expressions of the players.

That's how it's done by heavy-set, 42-year-old Herbie Sharfman, ace sports photographer for International News Photos. For the past 14 years he has clicked a procession of sparkling basket-hall pictures at sweat-stained Madison Square Garden, the 69th Regiment Armory in New York, and West Point. Past his lens have gone the country's fastest



specializing in sports, noted news cameraman Herbie Sharfman is a fixture at all the top basketball games.

dribblers, the tricklest ball handlers and eagle-eyed set-shot artists, from Bob Cousy to point-a-minute Bevo Francis, His sports shots have won several "Oscars" of the photography world: the 1953 New York Press Photographers' Award, the Look Award, the Encyclopaedia Britannica Award and the University of Missouri Award.

"Choice seats in the first row, within 20 to 25 feet

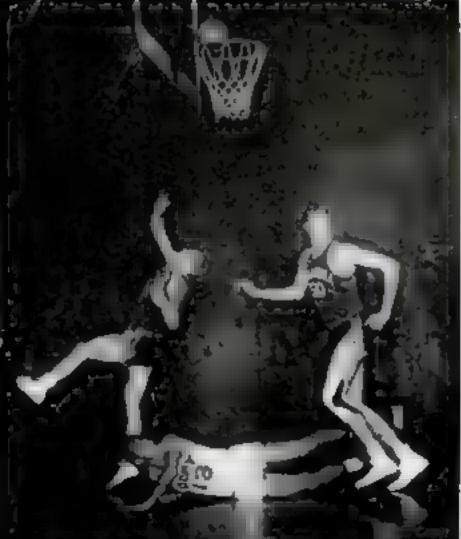
of the basket, are best," Sharfman says

This is the sneakered Klondike where the players seek pay dirt. Most of the fast action swings in and out of that area. "Preset your camera according to the distance you are from the basket. Follow the ball. Anticipate what's going to happen, like a man breaking away alone. Or a guy ready to go up for a

PLAYER FLYING into the laps of the spectators was shot by Sharfman at the 1949 game between Yale and NYU. Such sideline acrobatics always offer good photo possibilities.

WILL IT GO INT This stop-action photo caught the players watching anxiously while the ball was poised on the basket rim. Sharfman feels photos showing player reaction are tops.







lay-up shot. Watch for a deliberate foul."

If you're lucky enough to be on the first-row sidelines near the basket, try this trick with "jumpers." Jumpers are the players who break in fast, dribbling, and then leap for the lay-up shot. "You can dramatize this skyward attack," says Sharfman, "if you get a lot of jumpers and get down on the floor and shoot up."

## He Finds Gold in the Unexpected

In Sharfman's book, the shots that are pure gold are spills, dives for a loose ball, accidental jumps into the crowds, scrimmages underneath the basket. He pursues these with a hunter's zeal.

Are you sunk if you're stuck far off in the fifteenth row of the grandstand or up in the balcony? Not at all, "You can still shoot and have good results," says Sharfman, "but you change your camera attack. You shoot real slow and freeze slower action. Like a center jump. Here you can catch the leap upward, the player's facial reactions to the jump, the cheer leaders, the crowd action."

You can shoot backetball three ways by natural light, flash or strobe.

Yes, you read it right. You can shoot with natural light, for many gyms are as well lit as supermarkets.

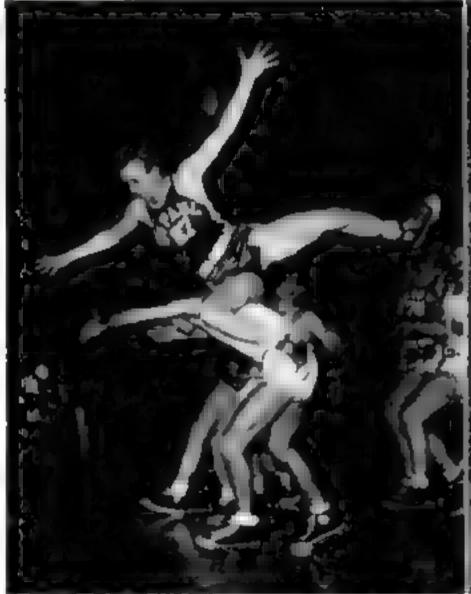
"At Madison Square Garden," says Sharfman, "you can shoot at 1/200 with a good camera at f/2 without flash, And with a good camera, you can even be in the balcony and freeze the action, by shooting slower at 1/50 at f/3.5."

## New Film Is Natural for Natural Light

Shooting with natural light has become still a stronger possibility since Sharfman made this statement to me. The Eastman Kodak Company's new Tri-X film, announced only a few weeks ago, is made to order for basketball photography.

Packaged in 35 mm., 620 and 120 rollfilm sizes. Tri-X is just about the fastest film available for amateur use. It has an ASA rating of 200 in natural light—twice as fast as Super XX.

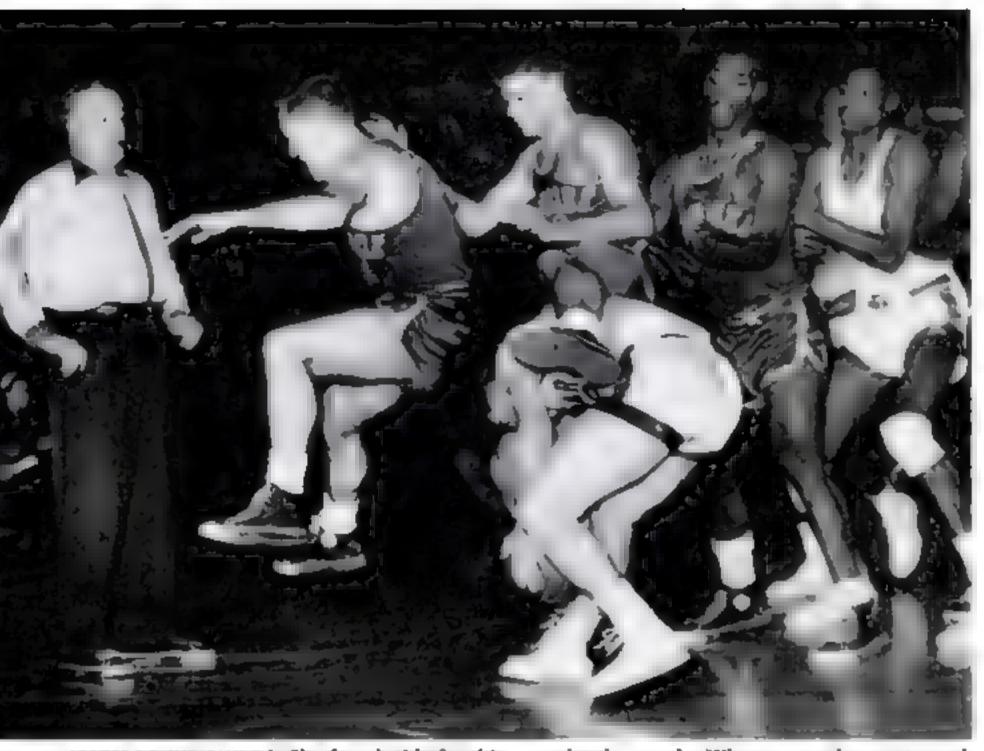
Sharfman's specialty is meat-and-po-



NO FLASH IS NEEDED to get excellent basketball shots. Lighting in gyms nowadays is often so good that you can snapshoot. But camera lights are still best for shots like this.



**FLOOR ACTION** is often more dramatic than action showing players on their feet. Supporting himself on one hand, this St. Francis player uses the other to pass the ball to a teammate.



LEAPTROG INTERLUDE is Sharfman's title for this picture, which won a New York Press Photog-

tatoes action, the faster the better. But he can touch subtler emotions, too. One of the most dramatic things he has snapped is "expectation." As Sharfman puts it, "A player shoots. The ball goes up and rolls around the rim. All the players look up in a variety of expressions, There's drama in that picture."

### Sports World Is His Beat

Born in Chicago and raised in an orphanage, Sharfman broke into sports photography via the back seat of a motorcycle. From an International News Photo motorcycle messenger, Sharfman got into the photo lab, and then into general news photography. Today, he's the sports specialist for this tremendous photo syndicate, covering championship fights, the World Series and the top basketball games. He lives in Brooklyn, N. Y., with his wife and two daughters, Lenore and Rebecca. If

raphers' award. When one player stooped, others behind leapfrogged over, one by one.

you're a fight fan, you may remember his brother, Sammy Sharfman, who was a pretty good middleweight boxer in the Thirties.

Don't think of basketball strictly as an indoor proposition, Sharfman counsels. "In the past 20 years, basketball has gone outdoors. Today, you can shoot a lot of pickup teams and weekend athletes at the local playgrounds. And there's some wonderful stuff to shoot."

In almost any neighborhood you'll find men in Army pants and T shirts playing basketball with one eye on the basket and the other on the baby carriage.

"Those outdoor basketball games are a wonderful place for camera fans to practice before attempting to shoot a real game," says Sharfman.

"In shooting outdoor basketball action, stick to the principles of outdoor sports photography: adequate sunlight, proper shutter speed, fast film."

END



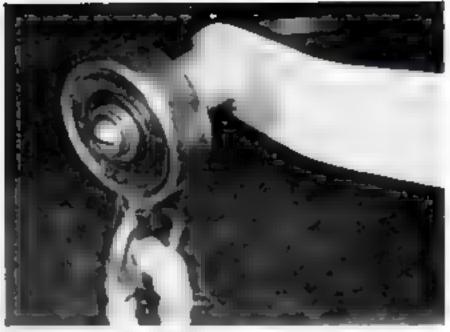
AFTER working as much paint out of a roller as you can by rolling it over newspapers, spin it clean with your electric drill. Make an arbor for the sleeve from a piece of heavy, dowel or clothes pole and drive a %" wood screw into one end. Cut the head off the screw and chuck it in the drill. Force the roller sleeve over the arbor and dunk it in thinner.

Shove the roller and the drill into an empty pasteboard carton and pull the trigger. Repeat the operation if necessary.—
L. M. LaBar, West Pittston, Pa.



## **Homeowner Plans for Additions**

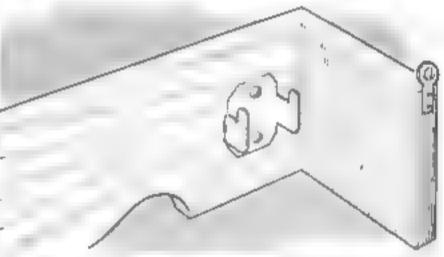
If your bankbook is not as expansive as the dreams of your new home, plan the whole house anyway, as John Morgan of Holbrook, Mass., did. He envisioned a garage and connecting breezeway on one side of his house, to be added later. With this in mind, Morgan had the builder install the end timbers on the wall of the house before shingling it. Now, when the time comes to build the breezeway, the job will be a breeze. He can begin his framing without removing any of the shingles.



## Tangleproofing a Bell Rope

When church, school or fire bells are rung with too much enthusiasm, the bell often flips over, tangling the rope around the bell crank and supports, making it necessary to climb the tower to free the rope

Make a free-turning rope eye by screwing an eyebolt into a hole drilled and tapped in the tread of a roller-skate wheel. Weld the eyebolt to keep it from unscrewing itself and mount it on the bell crank with a bolt and short spacer to hold it clear. —Ronald L. Ivez, Williamsville, NY



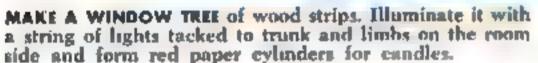
## Make a Cornice...the Easy Way

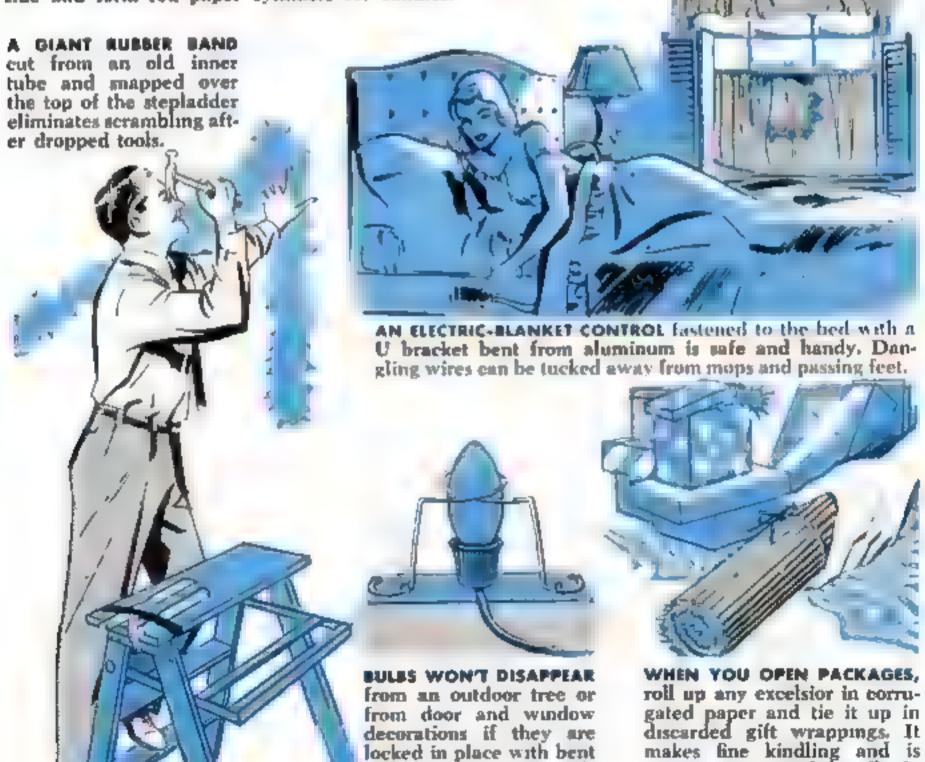
Using only a hammer and saw, you can turn out good-looking cornices. Here's how my husband did it in an afternoon

Measuring the width of the windows, outside the casings, he added 6" to the length needed so the cornice would extend 3" on each side. To this he added another foot to allow for two side pieces, each 6" long. This gave him the total length of 6"-wide pine needed for each window.

After sawing off the two endpieces, he fastened them to the front with glue and small nails. He pounded an L hook into the wall on each side and screwed eye hangers on the cornice ends. We used our old drapery fixtures in each end of the cornice and hung the rods on them.—Ann Friday, Medicay, Ohio.







Please turn the page for more home tips

with staples.

wire fastened at the ends

easy to store and handle in

compact rolls.



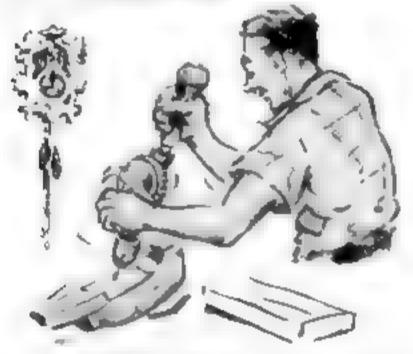


By Henry B. Comstock MONSTROSITY, pretty toy, or museum piece—the choice is yours when you assemble a ship-model kit. The carefully detailed Mediterranean merchantman shown here had its start in the box at the right, But it could easily have been a lot less handsome

If you are a ship-kit modeler, check your construction methods with those of your fellow hobbyists on the three following pages. Are you a "Kit Carson" a "Literal Lyman," or a "Super-Scale Smith"?



1. "SCRAMBLE ALL PARTS thoroughly before you sharpen your hatchet," says Kit. "Some of them are bound to fall together. Next, throw away the plans. That way, your model will have a custom-made look."



2. Kff FIGURES his sharp eyes are worth a dozen rulers, squares and calipers. What if some of his masts cant a bit to port and starboard? He can always spring them back in line with a 90-pound tug on the shrouds.



3. "RUN UP YOUR COLORS before you finish shaping the hull," Art counsels. "Then slap on the anchor, dinghy and poop lamp. Little tricks like that helped the kaiser shipyards set production records 10 years ago."

KIT CARSON is a balsa-wood beaver. Each year he chops up enough Peruvian softwood to float an armored division. Kit is the boy who can turn a \$1.50 ship kit into five cents' worth of mantel-piece flotsam faster than you can say "deflation." His methods, based on no trial but plenty of error, are unbelievably simple. Kit times his projects with a cuckoo clock.



4. Kit HAS A KNACK for rigging, He starts with the mainmast. This traps him in a nylon spiderweb, making access to the foreand mizzen-masts impossible. But why worry? Thick and busky, they need no staying.



5. OOPSI The brittle balsa snaps when Kit tries to bend the skids. "Forget 'em," he says. "They'd be buried under the paint job, anyway." A splash of high-gloss enamel and kit's one-evening project is complete.

LITERAL LYMAN structions and packaged parts. He reads everything five times, including the trademark and manufacturer's address. But he's a painstaking craftsman and every kit he puts together is a topflight advertisement for its manufacturer.

 STUDYING PLANS and dope-sheet carefully, Lyman sets up an orderly work pattern. To help him shape a symmetrical hull and align deck fittings and rigging correctly, he uses templates and a temporary wood base.



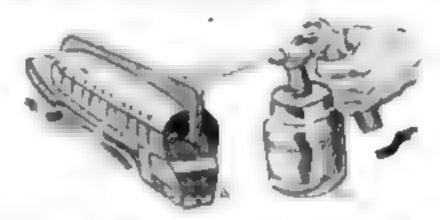
2. UNUKE KIT CARSON, Lyman has no trouble bending balsa skids. Before applying each strip, he cuts notches at intervals along its inside surface, then soaks the wood in a basin of hot water to make it pliant.



couldn't build a model of a surfboard

without a full set of blueprints, in-

3. PLANKING, printed on balsa deck lifts, disappears when Lyman sands down porous wood. Lyman knows better than to try scribing planks on balsa, Instead, he covers the lifts with neatly scribed Bristol board.



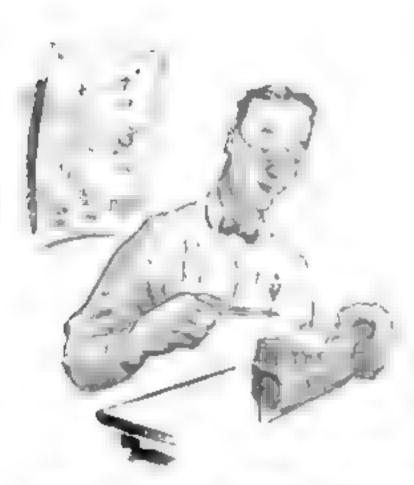
4. LYMAN shellars the finished hull, then sprays large color areas with lacquer. He sands each coat, cuts down gloss with final spray of clear, flat lacquer. Details are added with a brush, using oil colors.



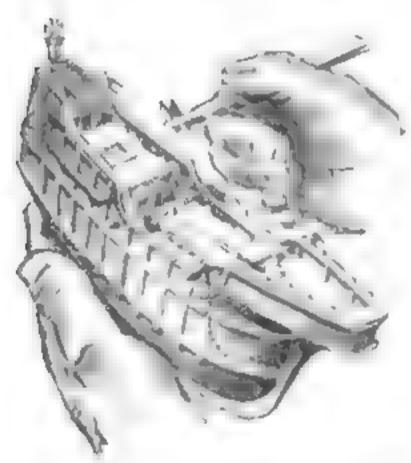
5. MASTS AND SPARS get a cont of orange shellae before Lyman attaches them to the fully painted hull. Last step is the rigging, which starts with the foremast. His "Santa Maria" is handsome but somewhat toylike.

SUPER-SCALE SMITH is a bearcat for realism. Down at the local public library, Super-Scale learns that his "Santa Maria" kit plans are actually based on a seventeenth-century merchantman. Content to call his model.

learns that his "Santa Maria" kit plans are actually based on a seventeenth-century merchantman. Content to call his model that, he makes sketches of hull, armament, and rigging features not included in the drawings that came with the kit. Smith even makes a study of period costumes, for his model will be sailed by 3-meh figures, appropriately attired,



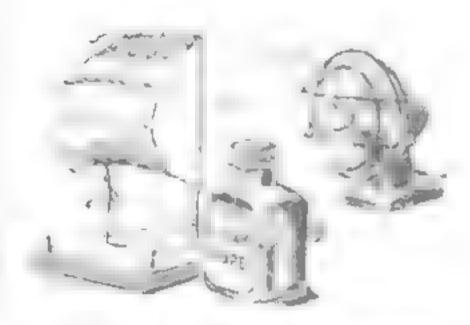
1. POT-METAL STERN LANTERN supplied with the kit doesn't measure up to Smith's standards so be turns another from white pine. Rudder chain and aftercastle windows add authentic flavor to the towering transom.



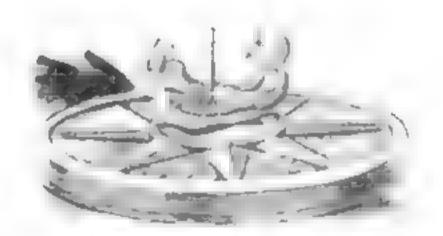
2. LADDER CASTINGS are off-scale so Smith builds his own. He reinforces the gunwales with inboard bracing and shapes a second anchor—only one came with the kit. "Smithsonian" touch is whipstaff to throw tiller.



3. SLACK SEADS supplied with kit don't look enough like deadeyes to suit Smith. He buys accurate scale reproductions (at 85 cents a dozen), and then carefully threads them in a fiber jig to insure correct spacing.



4. NYLON SAILS are an anachronism, but they look like the real thing. Soaked in clear airplane dope, the cloth is stretched loosely over wire frames and billowed out with the blast from an electric fan.



5. SMITH GOES OVERBOARD on a flossy base for his model. White-pine carving of a mermaid is mounted at the center of a stylized compass, where it rotates once a minute, turned by an electric clock motor.



### The Saw You Can Build into a Workbench

Bench plans are yours for the asking, and the new radial-arm unit lifts out for use elsewhere.

By Herb Pfister

THE three-dimensional movement of a radial-arm saw makes it an easy tool to handle. The work lies still on a table while you pass the saw over it from almost any direction in an accurately guided path. DeWalt has just announced a new radial-arm saw for home-shop use. It's a handly-man-size duplicate of their larger industrial saws and can handle a wide variety of cuts. You can use the saw to build its own bench, DeWalt, Inc., P.O. Box 540, Lancaster, Pa., will send you blueprints free upon request.

Please turn the page for more radial-arm saw tricks

**DECEMBER 1954 187** 

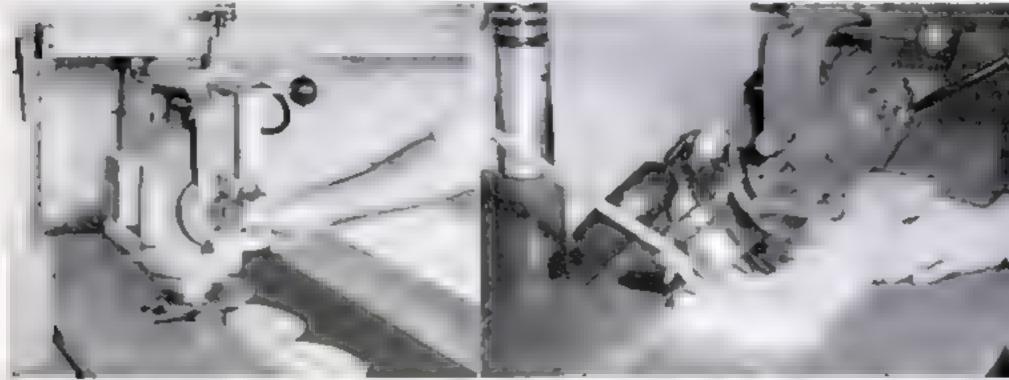
TRICK CUTS like this saucer cut come naturally to a saw that can move in three planes (height, swing and tilt). Here wood is scooped out by tilting blade.





SHADOW-BOX CUT. Compound angle is made in one swing. Arm is set over to 30° right-hand miter and blade tilted to 35°. Stock is held against fence.

CONTOUR CUTTING. Tilt and swivel the motor to set blade on diagonal to plow out desired contour. Stock is pushed along fence beneath 9" blade.



SCALLOPS, useful for valances or decorative muldings, are cut with dado head. Dado is locked at desired height and work is pushed into it until it touches fence.

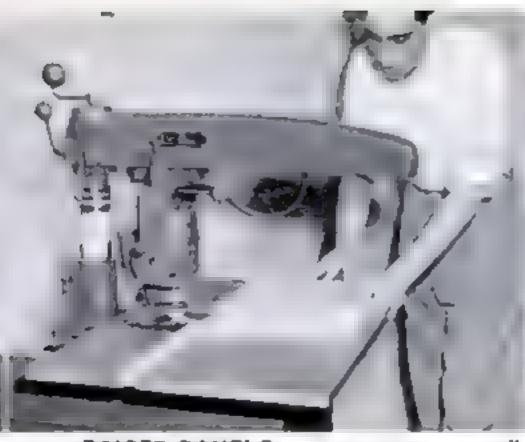
V CUTS—can be made to any depth in one pass by building up the dado thickness and setting it at a 45 angle. The work is pushed indemeath the niotor



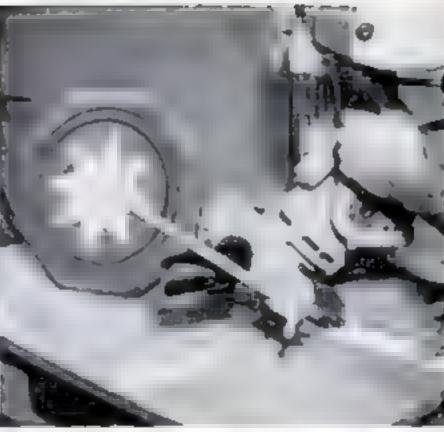
SABER-SAW ATTACHMENT mounts on motor in place of the saw guard. The blade works in a hole drilled in the saw table.



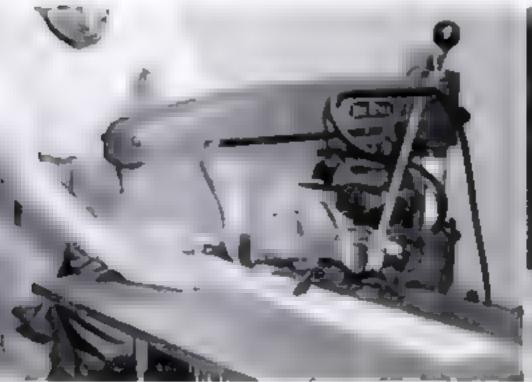
BORING. Special bits designed for counterclockwise rotation of the motor make the radial arm saw into an accurate boring machine. Scale on arm spaces holes evenly.



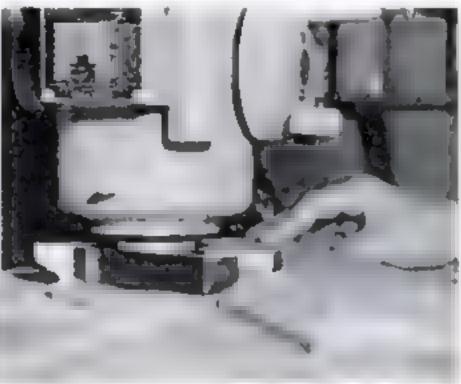
RAISED PANELS come out even on all four edges because cuts are made with board moving flat on table. The blade is tilted upward 5 or 10



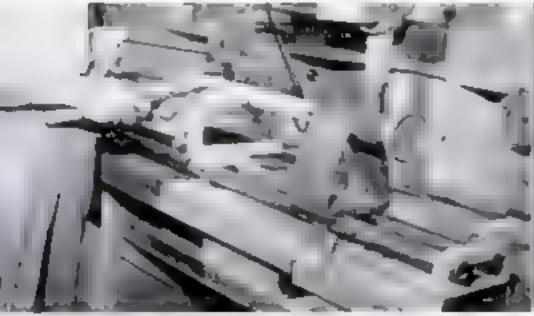
DIAMOND SHAPES, end from triangular strip of wood, can be assembled into attractive three-dimensional wall plaque. Pieces are in foreground on table.



MOLDINGS can be made with two-point molding cutters which come in a variety of shapes. The guard almost covers the cutter and throws chips out to side



SHAPING is done with a three blade cutter head. Above irregular piece follows plywood disk tacked to table. The work is pushed along the tence for straight shaping.



WOOD-TURNING LATHE has 12" swing It clamps on the saw table and gets power through a V belt running to a pulley on the motor

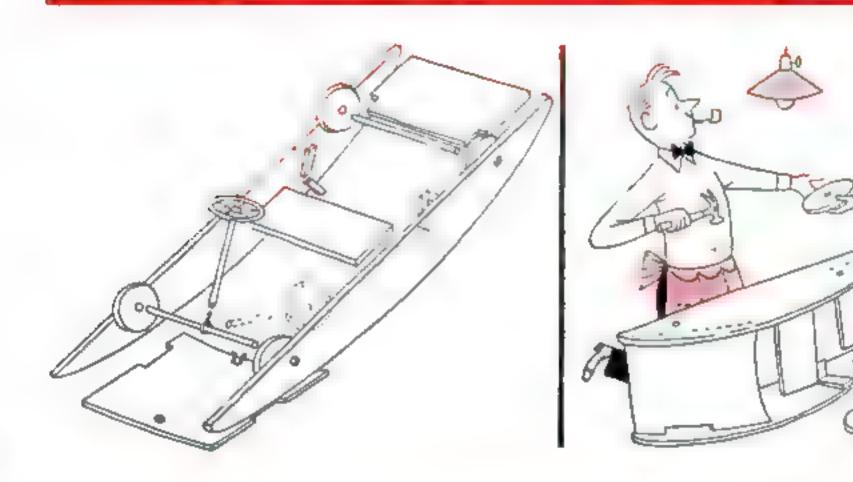


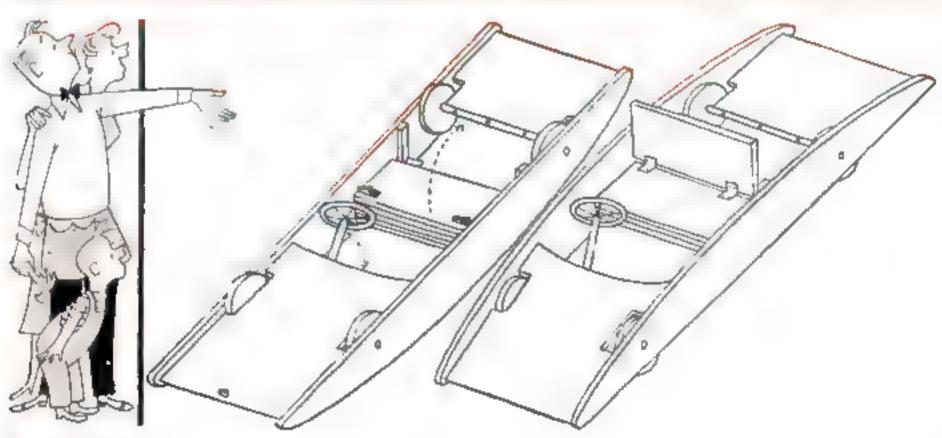
SANDING can be done with the drum sander shown or disk sander which also acts as surfacer. Attachments are available for grinding, buffing and routing END

By Roy Daty and Warrant Pryor

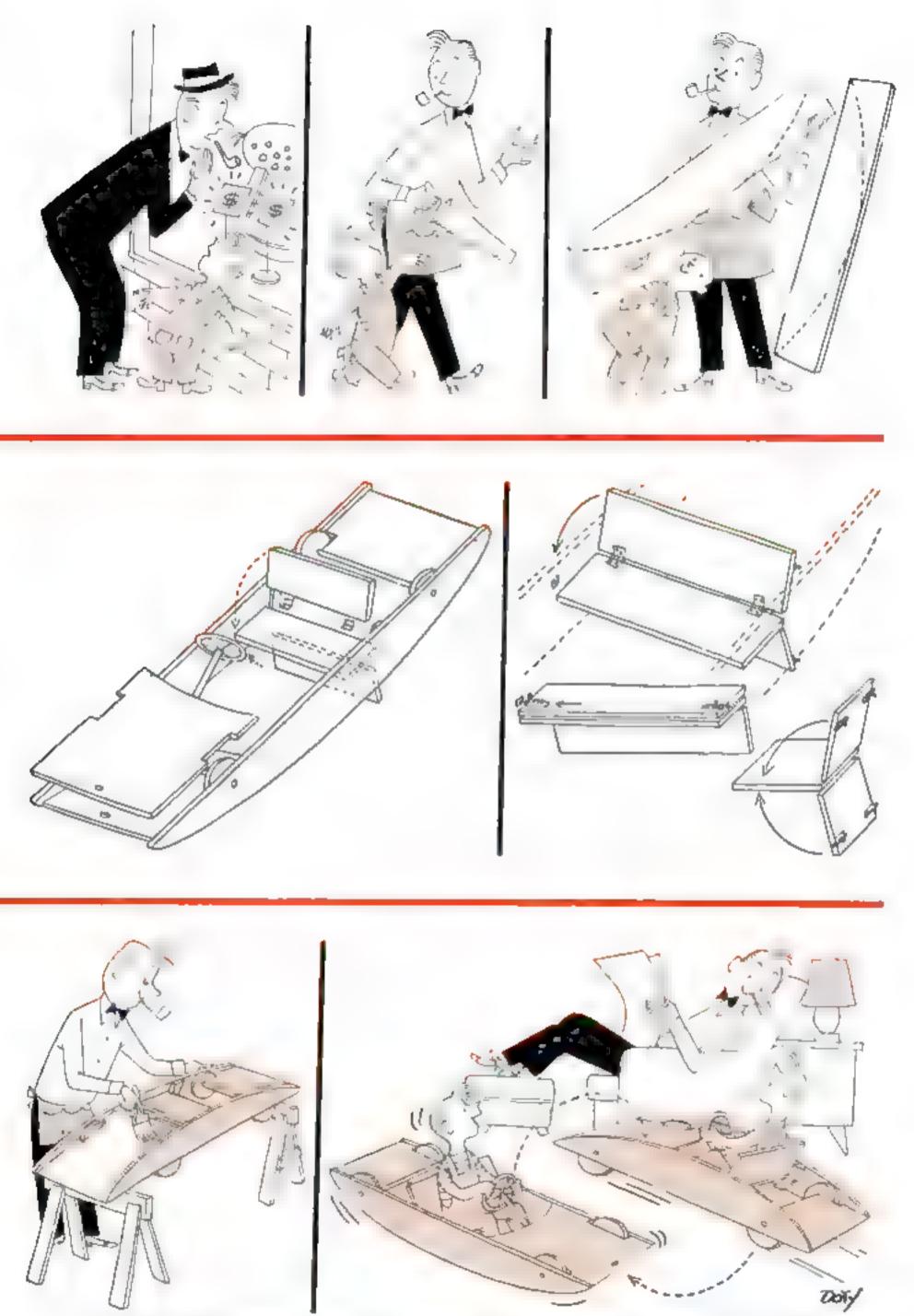
# Wordless







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Next Month: Hitching a slide to a bunk bed gets Junior out fast DECEMBER 1954 |9|

### Our Table Top Is Parquet Flooring

Resembling handsome inlay work, the wood blocks come with a durable factory finish.

#### By Leslie E. Bailey

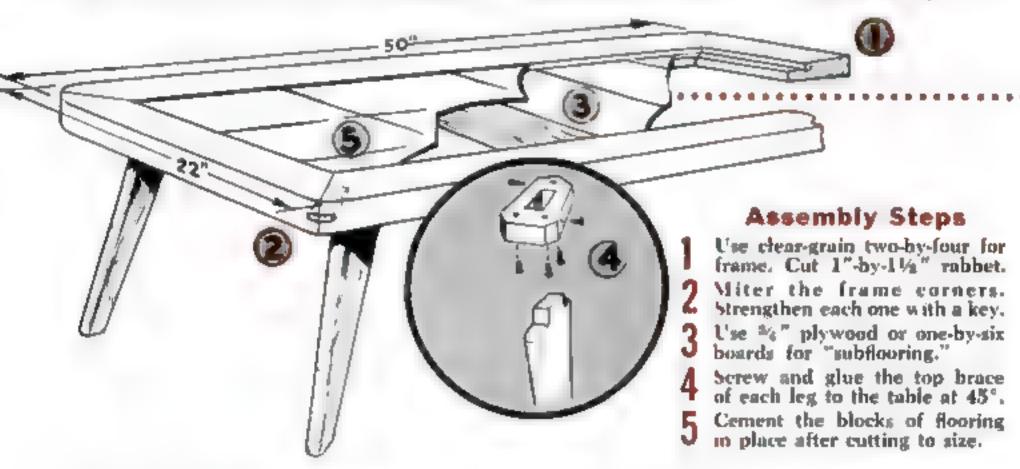
WHEN my wife and I first saw samples of modern parquet flooring, our immediate reaction was, "Do people walk on this handsome stuff?"

We had only recently bought our home. One of the things we still planned to buy, or perhaps make, was a long, low coffee table. On seeing the flooring.\* we into smaller pieces than the 12"-square piece normally supplied. Best of all, the top can be put into place with nothing more complicated than cement.

Making the frame. A simple frame makes the body of the table, and holds a plank (or plywood) "subfloor" on which the flooring blocks are laid. Select a piece of straight, clear-grained fir two-by-four. Cut corner miters carefully, in order to insure a tight fit when the frame is glied up.

Cut a rabbet on the inside edges of the frame pieces to take the subflooring and top. Use either \$" plywood or oneby-six planks for this. The rabbet in the frame should be as deep as the thickness of the subfloor plus the floor blocks. These are usually \$" to \$" thick,

You can strengthen the frame and get a more accurate joint by adding a key at the corners. Edge-cut a slot across the mitered corners to take a 3"-by-1"



both had the same inspiration—use it. We did, And here's the result, a 22"-by-50" table built for less than 820. The parquetry gives the top the appearance of fine inlay work.

The factory-applied finish on the blocks provides a rugged top, highly resistant to the bumps and spills most tables encounter. The blocks are flexibly joined so you can split them easily strip, a job which you can do easily and accurately with a dado cutter on a circular saw. Any part of the key extending into the inside rabbet can be chiseled away after assembly.

Gluing the miters. A gluing jig makes an easy way to assemble the frame. Nail a pair of cleats on a board to hold the ends in position. If you do not have cabinetmaker's clamps, a piece of rope twisted with a stick will pull the miters together until the glue sets. The wood-

The flouring him ks we used were made by Parka In Indirectly 9 Ks.



All of our friends wonder how we ever accomplished what looks just like an intricate inlay.

en keys at the corners are a big help in lining up the joint and pulling it up tight.

After rounding off the corners and sanding the frame, the subflooring is laid into the rabbet. Glue and screws will hold it tightly.

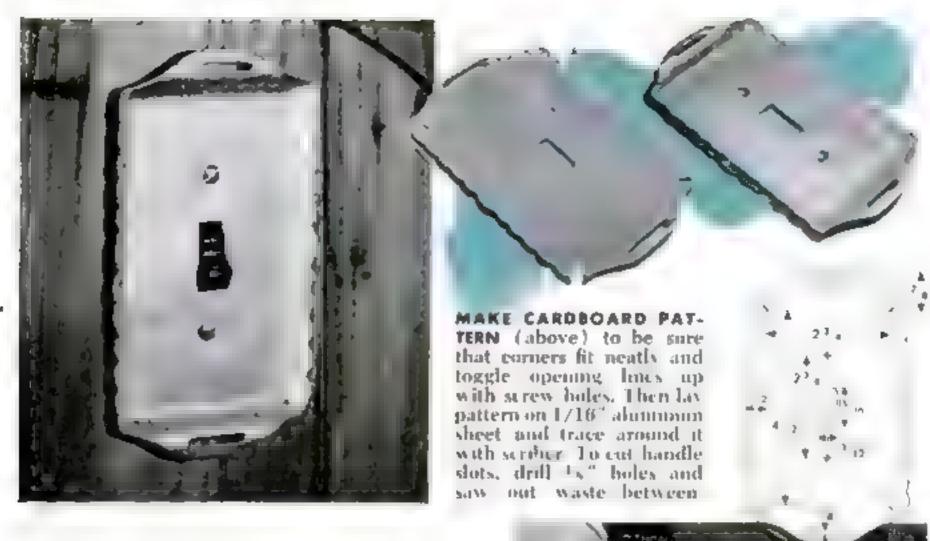
Attaching the legs. Each leg assembly is made in two parts, the leg and a brace which attaches to the underside of the table. Lay a leg out full size on paper for accurate tapers and angles at top and bottom. Round off the leg edges with plane or spoke shave after cutting.

The leg brace is made of the same material as the leg, either oak or maple flooring strips. Fit one end of the brace into the corner of the frame. Cut a mortise in the brace the width of the leg and 1%" long. Cut the leg end to fit this mortise snugly.

Drive screws through the brace into the leg from opposite sides after gluing the joint. Before the leg is assembled, holes should be drilled for attaching the leg to the bottom of the table. Line the leg assembly up on a line drawn from the mitered corner, and attach the legs with glue and screws.

Begin finishing the table with a penetrating oil stain to blend the dissimilar woods used in the table, and apply a varnish or lacquer finish. Rub the finish down carefully, and your table is now ready for its inlaid top.

Parquet goes in last. This is the easiest part of the project. Use a linoleum trowel to spread the cement evenly and with fine ridges on the subflooring. Then simply lay the parquet blocks in the cement, and your modern coffee table is finished.



### Aluminum Designs Will Dress Up Your Light Switches

If ERE's are case way to been up planshooking bight switches and help keep them clean to boot. These decorative wall plates, snipped from abuninum sheet, not only add a novel touch to any room, but their projecting edges channel smudgy fingers toward the switch itself, keeping them off the wall. They're also a helpful guide in the dark

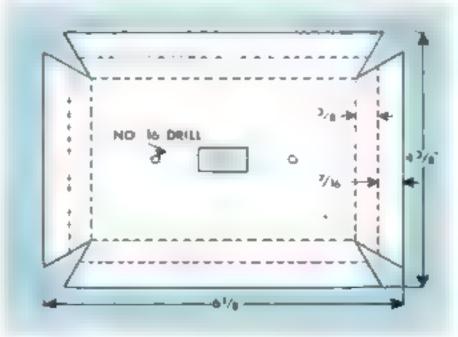
The miniature serving tray spells food on the way in the kitchen or during areas. The plainer picture-frame type fits nicely in other spots, For a hammered finish, as shown on the tray, tap all over with a ball-peen hammer

The patterns shown are for single-toggle switches. For multiple types or outlet boxes, use the existing plates as guides for cutting the openings.—Walter E. Burton, Akron, Ohio.



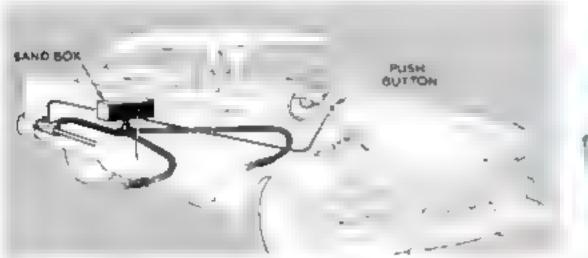
jewelers saw, as above, or fine-footh coping saw, Drill starting hole for toggle opening. Bend up sides, solder corners, and ble edges smooth.

PICTURE-FRAME PLATE (at left and below) has simple lines that suit any room. Outer edges protect farther than center, letting plate hug wall where boxes protrude.



1. Poor Opens Electrically. Easily installed on the ceiling of any garage having an overhead door, this radiocontrolled unit lets you open the door from the car. A button on the dash sends out an individually tuned impulse to the receiver in the garage to unlock the door, open it and turn on the light. After you drive in, the unit closes and locks the door and turns out the light. A safety clutch stops the door if it should hit against an obstacle. Lumber and building-supply dealers stock and install the unit.





### New for Your Car

2. Exhaust Blows Sand Under Wheels. This road sander utilizes the power in your car's exhaust to blow sand back under the rear wheels where it can provide traction

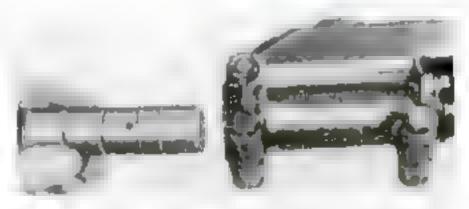
on slippery roads. A valve controlled by a push batton on the steering column opens the sand hopper and diverts exhaust pressure to the sand-distribution tubes.



3. Snow Tire Is Silent. Staggered grooves and interlocking cleats in the tread of this new tire give 1,940 gripping edges in snow or mud. It is free from rumbing noise, permitting year-round use.

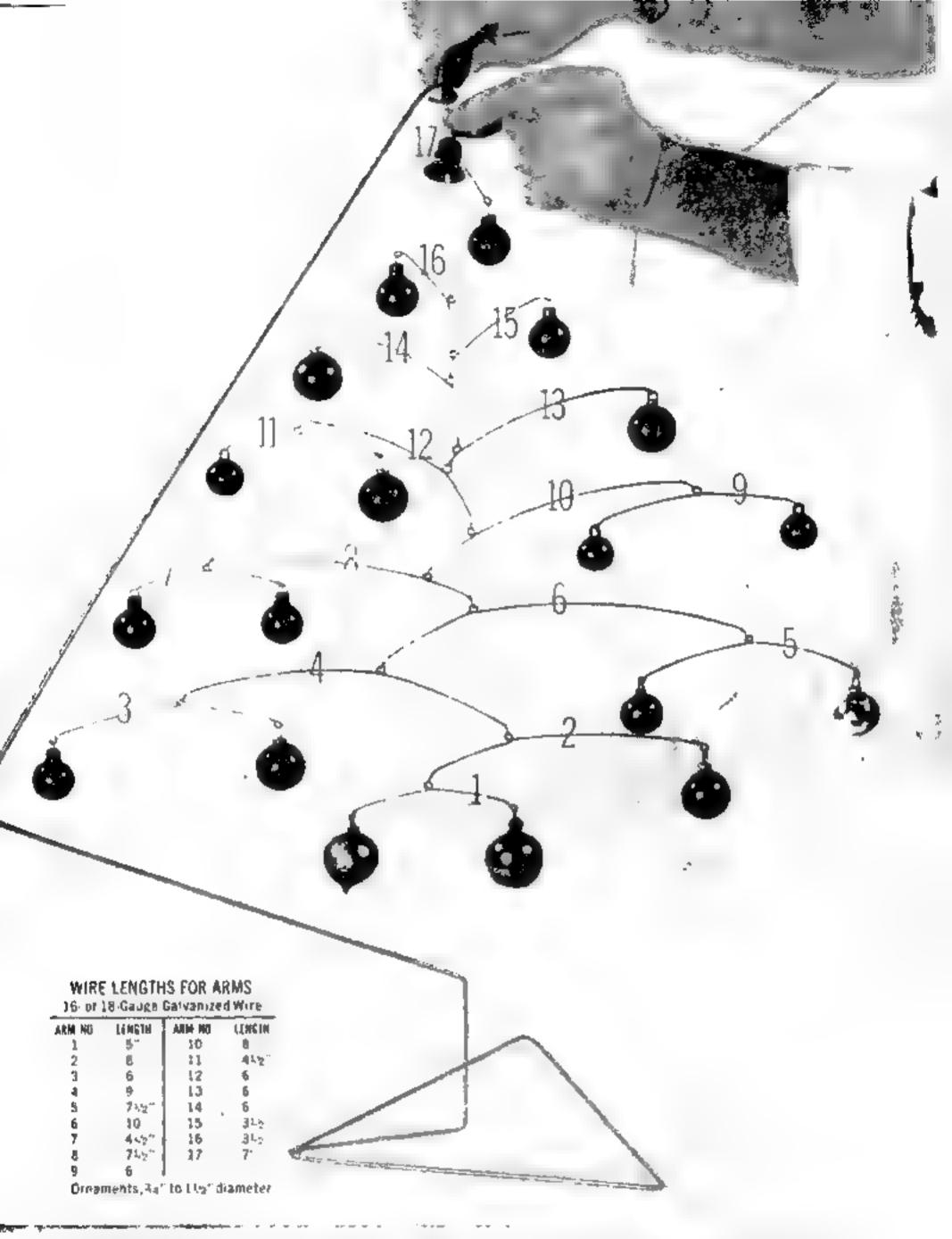
4. Lighter Has Ash Guard. When this lighter is in use, a telescoping sleeve slides out over the element to catch sparks or falling ashes. The sleeve also keeps the red hot element from touching face or clothing.





5. Cartridge Rebuilds Brake Cylinder. In 20 minutes, you can restore your worn brake master cylinder to new condition by inserting a self-contained piston-and-liner assembly in the cylinder bore. The job can be done without removing the cylinder from the car. The cartridge fits most General Motors and Chrysler cars manufactured since 1941.

Further information on these products can be obtained from: I.
Alliance Mig. Co., Alliance, Ohio; 2. Automotive Sund rax. Inc.,
20 Pemberton Sq., Boston, Mana; 3. Armstrong Rubber Co.,
Best Hacen 16. Conn; 4. Casco Products. Bridgeport. Conn;
5. Median-Liner Co., 1029 Madison St., Oak Park. II



ALL MOBILES START FROM THE BOTTOM. It's impossible to begin at the top and continue adding weight without making adjustments for each new unit added. Numbers on the photograph

above indicate the sequence of assembly, and the chart gives the approximate length of wire needed for each arm. The stand is bent from a 6' length of 1/2" wire or brass rod. The way modern artists use bits and pieces in decorative designs may surprise you. You can experiment with novel Christmas decorations. The results will please and fascinate friends.



## How to Make a Christmas Mobile

#### By John Lynch

of the Mureum of Modern Act, New York City

O MANY of us, mobiles are a familiar sight. They are a new art form created in the early 1930s and becoming increasingly popular as room decorations, and as settings for store displays.

What are mobiles? Your guess is as good as mine. In their pure-art form,

they aren't intended to represent anything. Most mobiles are abstract compositions of wire and metal, wood, glass or plastic shapes mechanically joined and delicately balanced to move with the slightest current of air. Frequently, though, they do take on more literal forms, like the Christmas tree above. But in any shape, making mobiles is fun. You put them together to please yourself and the result is like an abstract paint-



PLIERS, WIRE, and an assortment of Christmas-tree balls are the things you'll need to make a Christmas mobile. Here, end loops are being bent on a typical arm. FIND SALANCE POINT by holding the wire gently between the sharp cutting jaws of the pliers. Most arms are asymmetrically balanced or heavy on one end.

FORM CENTER LOOP by rolling wire around phers. Balance can be adjusted by rolling loop toward either end. Soft 16-gauge wire can be bent repeatedly before it breaks.

ASSEMBLE UNITS as they are made, beginning at the bottom of any type of mobile. Here, No. 1 arm is being balanced on No. 2 arm by adjusting the center loop.



USE BALANCE-TESTING TOOL (hooked piece of wire) to check composition as mobile develops. Ornaments shown vary in size from 34" to 142" in diameter.

praw outline of stand around completed mobile held flat against paper fastened to wall. Allow mobile to assume its natural position so stand will follow its shape.

ing with the added interest of movement.

About balance and composition. Both come to you more or less naturally Balance is part of the composition and composition affects the balance. The size and shape of the pieces and the length and curvature of the wire arms make up the balance and the composition. For example: a 1/16" brass disk, 5" in diameter, will easily balance three or four similar disks of aluminum, and when

they're painted, they will all look alike. The balance point will be nearer to the brass disk than the aluminum ones, creating an asymmetrical balance

Lee color for balance, too. While it will have no effect on the weight arrangement, it will balance the composition. Try your hand at making a gay Christmas mobile like the Christmas tree. Then you should have no difficulty with the abstract mobile that follows it.

#### Other ways of using your mobile



HAVING completed a mobile, the obvious question is, "What'll I do with it?" The stand shown in the construction photos is simple and effective, but a few variations can make your Christmas mobile even more interesting and attractive,

The easiest variation is in the mobile itself: try using bells or stars instead of balls—or mix 'em up. Paint the supporting arms red, green, silver or gold,

Much can be done with the stand, too. Make it two-sided to enclose the mobile completely, or bend the sides into scallops to resemble a Christmas-tree silhouette. Make the stand from plywood instead of wire, paint it and sprinkle it with metallic powder to make it sparkle.

Suspend the mobile from a wall bracket bent from %" wire, or cut a Christmastree silhouette from plywood, paint it and fasten it to the wall to serve as a background for the mobile. Or, take the casy way and suspend the mobile on a string attached to the ceiling. However you use it, your mobile will be a center of attraction in your Christmas decoration.

#### How to make an abstract mobile



You can really express yourself in an abstract mobile. Unlike the Christmastree mobile, which is a literal mobile designed to represent a definite object, an abstract mobile gives the builder free rein, unlimited as to shape, size or mood. The design and balance of an abstract

mobile can make it move dreamily, solemnly or wittily—like the difference between an exuberant fountain and a lazy, meandering stream.

Patterns and arm lengths are given for this mobile to help you get started. Afterward, you'll create others yourself,

Please turn the page for more on mobiles

#### MOBILES Continued

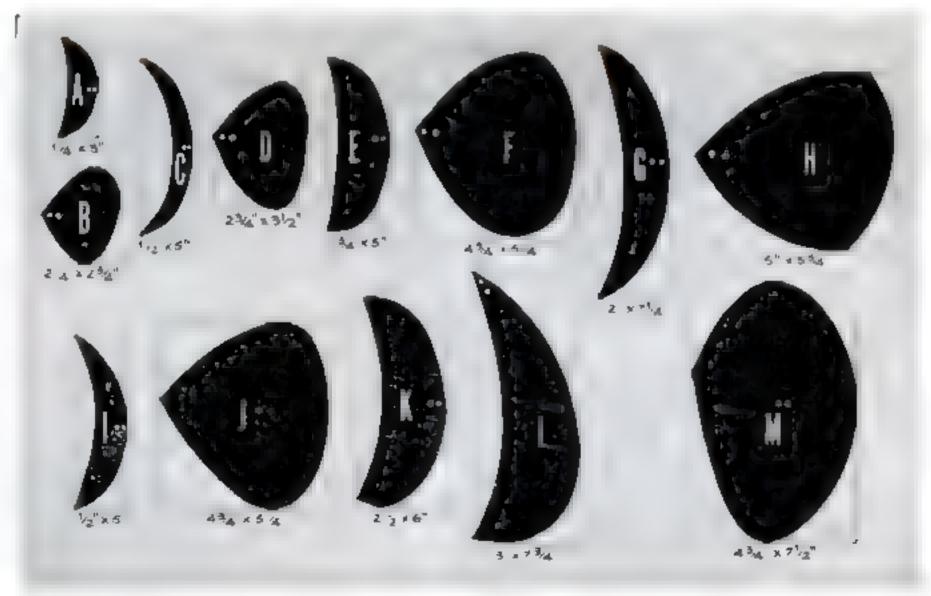
BIGGEST DIFFERENCE between abstract and Christmas-tree mobile is in method of attaching pieces. Here, wire arm is inserted in holes in vertical shape and bent over.

HORIZONTAL SHAPES (like C and E on preceding page) are suspended from their centers instead of their ends. Were is preformed to shape shown below, then inserted in hole.



SHORT IND is then bent over to clinch fastening. The supporting end is cut to desired length, then an eye is formed on its tip to join the matching eye in the arm.

BALANCE IS FOUND by gripping arm lightly between cutting edges of phers. Note that arm is attached directly to vertical piece but linked to horizontal piece.



ABSTRACT SHAPES for mobile pieces. Cut rectangles of cardboard or light-gauge sheet metal to sizes given, then sketch the outlines of the pieces on them. This way, each piece is sized in advance and can be cut without bending or cracking the material.

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1. Wallpaper is Dunked in Water Box. You can hang this wallpaper without brush or paste. A rolled strip is soaked in the water-filled box and is ready to go up.



2. Plastic Tub is Light. One man can carry and install this featherweight glass-fiber-and-plastic bathtub. It comes in five colors, two sizes 17 lb., 46" long, and 19 lb., 54" long.

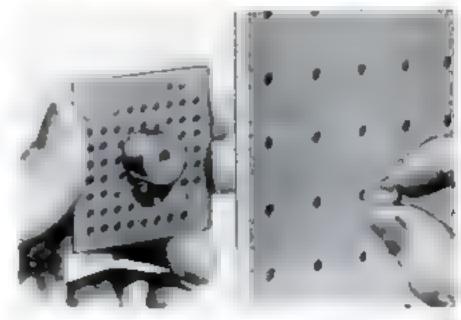
4. Anchors Hold Perforated Board. Putting up perforated hardboard is easy with these anchors. The small squares are emented to the wall and have threaded spacers that hold the board away from the wall Small bolts are serewed through the panels to hold them to the anchors.

Further nearmation on he products shown on this present he or march rom I the Birge Co. I. Sent's agent's Banaca I is a Carl A Strand Co. Branagham Mak. 3 Bir of affairs & Equipment Bir. 10-02 G h. Are. Long Land City. 6, 5 Yez 4. Managhe Corp. Bux. 77 I hought to he

### New for the Handy Man



3. Portable Stand Climbs Stairs. You can raise or lower the steel legs on this scaffold to make it stand firm on anything from an uneven floor to a stairway. Each leg is adjustable from 6" to 36". All four can be removed and stored under the 16"-by-48" platform. One pair of legs has wheels, and by picking up the opposite end the stand can be rolled from job to job



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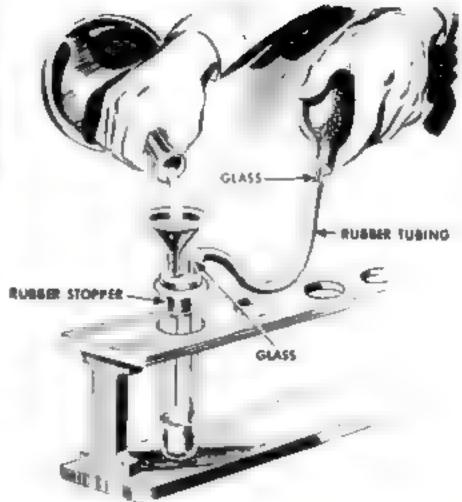
#### **Dowel Hanger Avoids Wrinkles**

Your trousers won't suffer from "coathanger crease" if you replace the cross bar of a number of wire hangers with a 10" length of %" dowel. End drill the dowel an inch deep, cut out an 8" section of wire, and spring the wire ends into place — Gilbert C. Close, Hawthorne, Calif

#### Wrap Putty to Keep It Fresh

To keep putty from hardening in the can, remove it completely when you first open it, knead it into a ball and work from this Then ball it up again, enclose it in plastic food wrapping and put it back in the can.—
R. L. Clough Jr., Bristol, Conn.

▶▶▶A portable turntable for a TV set can be made from an old piano stool. Fasten a square of X" plywood to the top.



#### **Chemical Filter Made Quickly**

AN EMERCENCY pressure filter to speed up home experiments can be made with this simple rig when more elaborate apparatus isn't available. Fit a large test tube with a two-holed rubber stopper, one hole for the filtering funnel and the other for a short bent-glass tube. A syringe bulb is then squeezed to remove air and attached to the glass tube with a short rubber tube. Letting go of the bulb creates a vacuum in the test tube that draws the liquid rapidly through the filter.—A. Lapinsky, Benoni, So. Africa.

#### DETERMINING AREAS

Triangle=base times half perpendicular height

Parallelogram=base times perpendicular height

Trapezoid=half sum of parallel sides times perpendicular height

Circle=radius squared times 3.1416

Ellipse=long diameter times short diameter times 0.7854

Regular polygon=sum of sides times half perpendicular distance from sides to center (altitude of triangle)

Cylinder=area of both ends plus circumference times height

Sphere=diameter squared times 3.1416

### 8 Strange Tales of TV Antenna Troubles

#### By Art Margolis

OUR television set has a cozy spot in the living room and gets lots of attention, Its antenna roosts on the roof winter and summer with never a thought from anyone, Small wonder if it quits funneling shows downstairs.

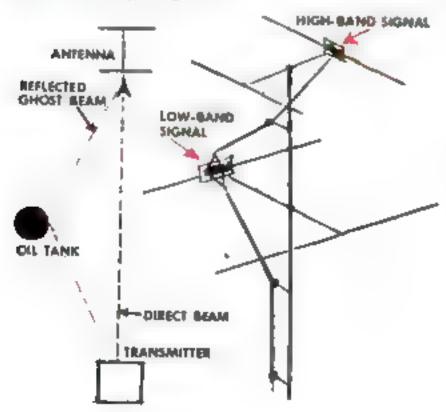
As a repairman, I've seen these channel-grabbers do some strange things. Among my case histories you may find a diagnosis for your own TV trouble.

#### Case of the Bouncing Ghost



O NE day a customer in an old mansion complained about a ghost on Chaunel 10. From experience I knew enough to go up on the roof and look about. And there on the horizon sat a huge oil tank.

What was happening? Channel 10's signal was entering the TV antenna on a line-of-sight path. But it was also hit-



ting the oil tank, bouncing off it and hitting the TV antenna again like an echo. The bounced signal, however, was losing the race by a gnat's whisker to the direct signal, creating a Johnny-come-lately image slightly to one side of the original one.

Luckily I had a ghost-laying trick up my sleeve. Each TV channel has a definite wave length, and if the antenna arms are cut to match one wave length, the antenna will favor that channel

Here they had a low-band antenna favoring channels 2 to 6. The high-band Channel 10 signal was not getting much of a break. I added a high-band section cut for 10 and turned it until the ghost gave up and disappeared from the screen.

#### Snow in the Firehouse

THICK snow was falling the day I found a childhood dream coming true. I was directing a group of anxious firemen as they set up a ladder for me to climb.

The TV set in their squad room pulled in all three local channels nicely, except when it snowed outside. Then Channel 10

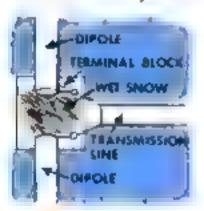


would match the outdoor blizzard with a reasonable facsimile. By hooking up a "rabbit ears" antenna, which got 10 loud and clear. I pinpointed the trouble in the antenna system. So up I went

The antenna was a dipole-two arms mounted on a plastic terminal block;

right away I examined the block and electrical connections, but nothing was wrong. Then I did a double-take.

There on the plastic terminal block, acting as an effective short circuit for Channel 10, was a layer of wet snow.



Why didn't it short out the other channels, 3 and 6? Because these lowband frequencies are less sensitive to leakage, while high ones (channels 7 to

13) will readily lose their energy to any

bypath offered.

Armed with a clean brush and a pressurized can of plastic, I removed the snow and sprayed a plastic coating on the terminal block and its connections. This ended the blizzard on Channel 10.

#### The Flicker of an Eyelet



IN PHILADELPHIA, dwarfed by business buildings, is a block called Elfreths Alley, whose quaint houses, cobblestoned street and hitching posts once knew Benjamin Franklin and Betsy Ross. Here I found myself one morning checking a TV set. The complaint was flickering and flashing on the screen. It disappeared when I connected my rabbit ears to the set, so I made my way to the roof.

One of the eyelets that connected the leadin to the dipole had broken loose. As the loose wire fluttered in the breeze, it intermittently touched the connection. This showed up as flickering and flashing on the television screen.

With a good connection restored, the TV set went back to its job on the street where so much American history was made.

#### The Man Who Wanted Commercials

ONE afternoon I was dispatched to an advertising agency downtown. The head man had a TV set in his office. Channels 3 and 10 came in fine, but



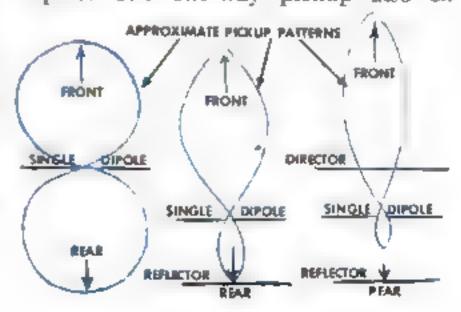
Channel 6 was ridden with auto-ignition spots, flopping and fading. Over his glass of mulk my client told me that seeing his commercials thus twinged his ulcer.

On the roof, I could spot Channel 10's transmitter six blocks away. Channel 3 was visible about 10 miles north. You could have pulled these in with a bent nail. But Channel 6 was somewhere behind the skyscrapers.

The type, size and shape of an antenna determine its sensitivity "pattern." By choosing your antenna pattern you can make signal pickup either strong and highly directional, or weak and broad.

The advertising company had a single dipole with wide arms broadside to Channel 6. But a single dipole has a broad front-and-rear pickup pattern, and this one was letting all the downtown electronic noises waltz in along with the signal.

I pulled it down and installed a new antenna with a reflector. A reflector is called a "parasitic element," because it is not connected to the transmission line. Slightly longer than the dipole, the reflector is parallel to it and narrows down the pattern, while eliminating rear pickup. It made Channel 6 stronger by reflecting more of its signal back into the dipole. The one-way pickup also ex-



cluded a part of the interference.

But there was still some, so I installed another parasitic element, a "director," this time in front of the dipole. This boosted signal strength and narrowed the pattern even more. The new skinny pattern pointed directly to Channel 6 and the interference hadn't a chance, while 3 and 10 still came in nicely.

#### The Picture the Wind Whipped



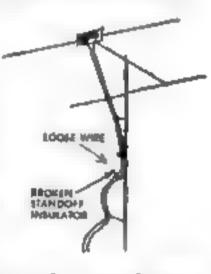
ONE blustery day
I got a service
call from a hotel.
The symptoms annoying its guests
were a Yo-yo-like
bouncing and, in
rhythm with this, a
fading in and fading out of the picture. My faithful
rabbit ears fingered
the antenna as the
villain.

A bellhop led me to a top-floor win-

dow that opened onto a rusty ladder clinging to the side of the building. I gulped, shakily crawled out on it, and got up to the peaked roof.

A broadcast TV signal induces highfrequency currents in the ribbon leadin wire, which pipes these down to the set.

But as the signal rides down, it produces magnetic fields around the wire. I found that the hotel's leading was loose because a standoff insulator on the mast had broken. The wind kept



flapping the wire against the metal mast. This distorted the magnetic fields around the wire, making the picture bounce.

Quickly I installed a new standoff insulator and snugged the wire down. Then I made my way down the ladder.

The manager was pleased to have the set working, but I said somebody else

could climb that rickety ladder next time.

"Ladder?" he said, "Why, there's a new elevator extension to the roof. You can't use that ladder. It's condemned!"

#### Detour Through the Den

SHE felt, my customer told her husband, like a witness at a Senate hearing. But I had to keep asking questions. These people were old customers who had always had clear pictures. Now the image had become unfocused and had lost fine detail. The antenna system was at fault but a



quick check showed no reason for it. Finally my cross-examining paid off, for I learned that this couple, in the course of finishing their basement, had rerouted the TV leadin.

Following the ribbon from outside, I saw that it was passing above the new ceiling. They groaned when told some of the ceiling must come down.

You can't shoot the high-frequency currents from a TV autenna down any old piece of lamp cord. The antenna is an electronic circuit, endowed with an odd characteristic called "impedance"

The transmission line must also possess this characteristic and, what's more, the two impedances must match. If they don't, some of the energy never gets to the receiver. Impedance depends on many things, not all in the wire.

As my customers ripped out the ceiling section, I breathed a sigh of relief. The trouble was there. When they rerouted the leadin, they had neatly taped the wire to a handy copper water pipe. This proximity to metal had changed the impedance along that section, and the electrical energy was not getting past in full strength. Some was forced back up the line to become a reflection. Then it would try again, causing ghosts. I ran

the line away from the pipe. The beautiful basement was then a mess, but the TV picture was beautiful.

#### The Set That Had Too Much

O'NE of my customers had it too good. There had been a championship fight in Philadelphia that no local channel had been permitted to show. But with his expensive high-gain antenna system and sensitive receiver, he had enjoyed the fisticusts from New York. So why, I asked him, had he called me? Reluctantly, he showed me Channel 3. Because of his "hot" rig this local channel was overloaded. Even at minimum contrast setting, there were no grays, only dark blacks and bright whites, the picture rippling as if seen through water.

This was an uncommon problem: to make only Channel 3 weak, A TV signal has three parts: the sound portion, the picture action and the horizontal-verti-

cal lock-in. Usually these are separated in the receiver. But IN VI OF if the signal is too TERM NAUS strong, separation of these elements gets snafued. In this case ONMY some of the picture signal was creeping into the lock-in stages, creating the SOO OHMS hula-hula act.



I had to weaken the overwhelming signal without altering the impedance match between line and set. Fortunately this is easy with a "pad."

On a small block of wood, I installed four low-wattage resistors and four antenna terminals. As the impedance of the line is calculated at 300 ohms, the signal enters the pad by way of a 300-ohm resistor. Then the signal runs smack into two 2,000-ohm resistors, and some of the excess energy is dissipated. Next, the weakened signal meets another 300-

ohm resistor, which matches the signal properly into the 300-ohm impedance of the set. I added a clip so that the pad could be hooked in for 8 or bypassed. With it, the local picture was beautiful, without it, the set got New York.

#### Roof-Top Feud



WITH murder in her eyes, Mrs. Hatfield told me that since Mrs. McCov installed her new TV set, her own had not been able to get Channel 10. The ladies' semidetached homes had a common chimney on which both antennas were mounted, parallel and with mere inches separating Mrs. McCoy's reflector from my customer's dipole.

Now a reflector feeds energy back to the dipole, provided it is scientifically spaced from it so that the reflected energy arrives perfectly timed, or in phase, with the signal received by the dipole directly. But nobody had scientifically spaced Mrs. Hatfield's dipole from Mrs. McCoy's reflector. In fact, the spacing was almost exactly out of phase, so that the reflection was canceling out the signal that did reach the dipole.

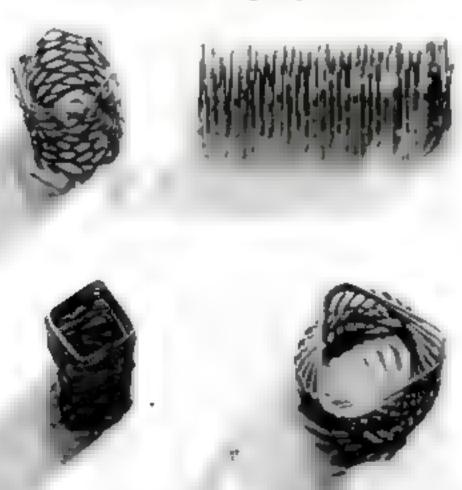
I suggested to Mrs. Hatfield that I reinstall her antenna elsewhere, but she refused to give way.

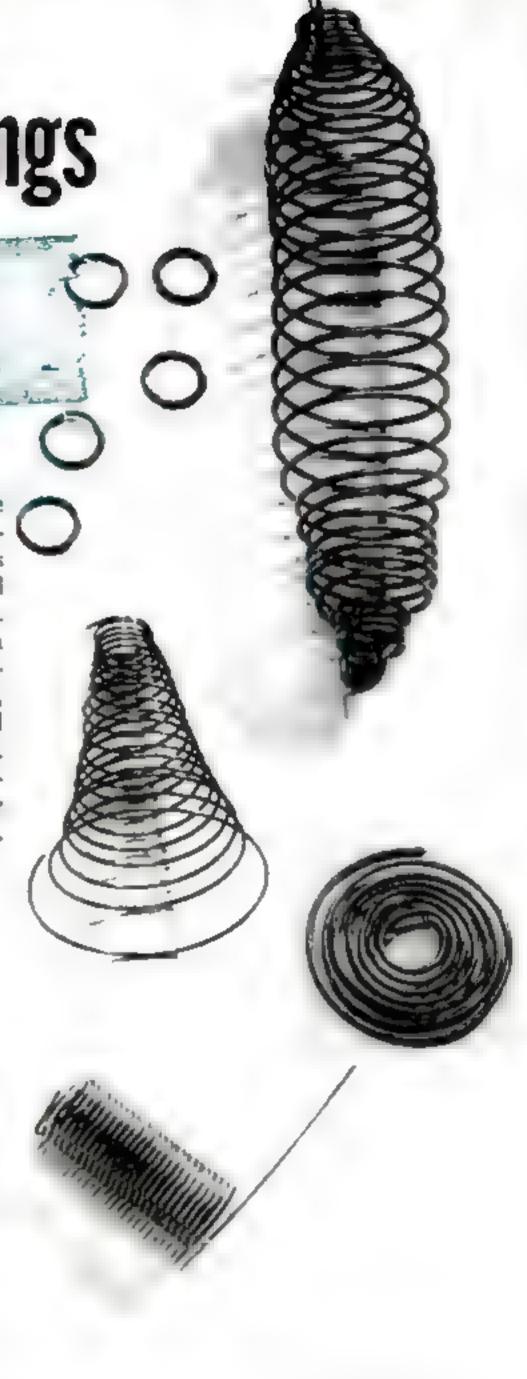
What I finally did was to lower Mrs. Hatfield's antenna by the prescribed distance a dipole should be from a reflector. Channel 10 snapped in immediately. Mrs. Hatfield was even more delighted when I told her that Mrs. McCoy's antenna was now working to improve her picture. This story is true. Only the names have been changed to protect you-know-who.

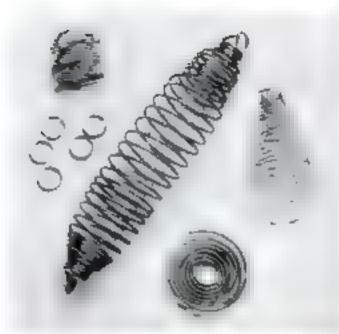
### Trick Springs and Round Rings

#### By Walter E. Burton

THESE trick springs work exactly like ordinary ones. They just look different. You know how a plain coil spring is made—just wind some wire around a rod and, boinng—the wire becomes a spring. The springs shown here came out of a springmaker's bag of tricks. That double-ender could suspend a bird cage in style, but if you didn't know the trick, you'd find it easier to make the cage than the spring. And those rings—ever try to make a perfectly round ring? Turn the page and see how you can make them by the dozen, and learn some spring tricks, too.

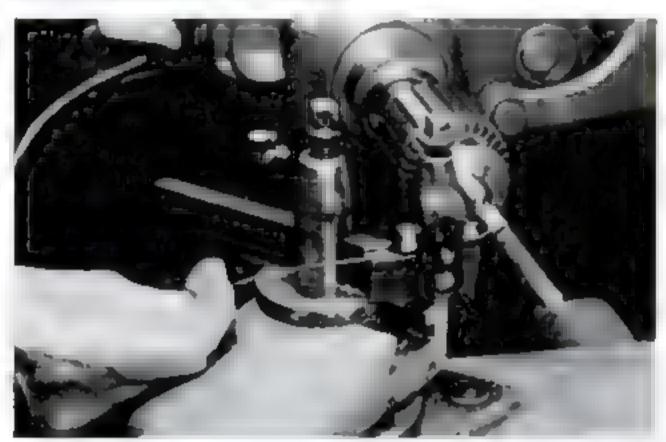






## Trick Springs and Round Rings

You wind them just like common ones. The trick is in the mandrel you use.



believe it or not, is wound on a triangular skaped mandrel. Though the coil appears triangular bere, when winding tension is released, it unwinds into a smare section. Automatic carriage feed of lathe controls spacing of turns A square winding man drel produces a spring compused of hexagonal turns, and a flat mandrel, such as a by "-by-12" har, turns out a spring with triangular turns. The corners of the triangles form a spiral pattern on the coil resembling the belix of a screw thread.



FLAT COILS are wound between two collars fastened to a mandrel with setscrews. The chief difficulty is to start the wire so that a kink is not formed in the turns opposite the point where the beginning end enters the hole in the mandrel. A hand drill, clamped in vise, made this handy winding setup.

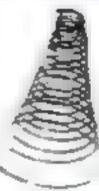


TWENTY-FOUR RINGS are made in one operation by winding a tightly spaced 24-turn coil spring and sawing it, as above, down the middle. Brass, silver or soft-steel wire is used. When winding any kind of spring, be careful when you release the tension so that the coil doesn't unwind violently.

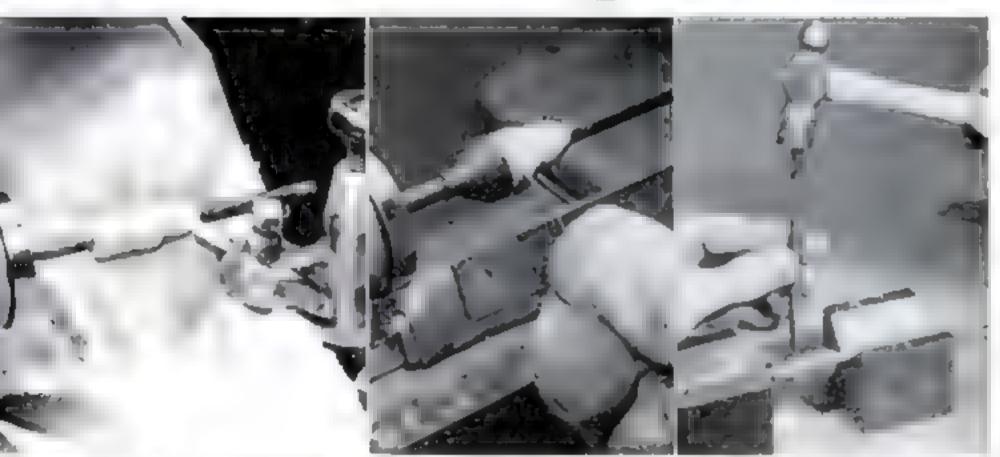




common spring is wound around rod using simple hand jig shown here. Rod chucked in lathe running at slow speed makes the job easier and leaves the hands free. Slot (shown here) or hole in end of rod holds the starting end of wire to keep it from slipping as the coil is wound.



conical springs are wound on tapered mandrel. Hole drilled in straight part at tip holds starting end. Soft wire retains shape of mandrel, but coils of hard piano wire open up when the winding tension is released, producing a spring that is nearly twice the size of the mandrel.

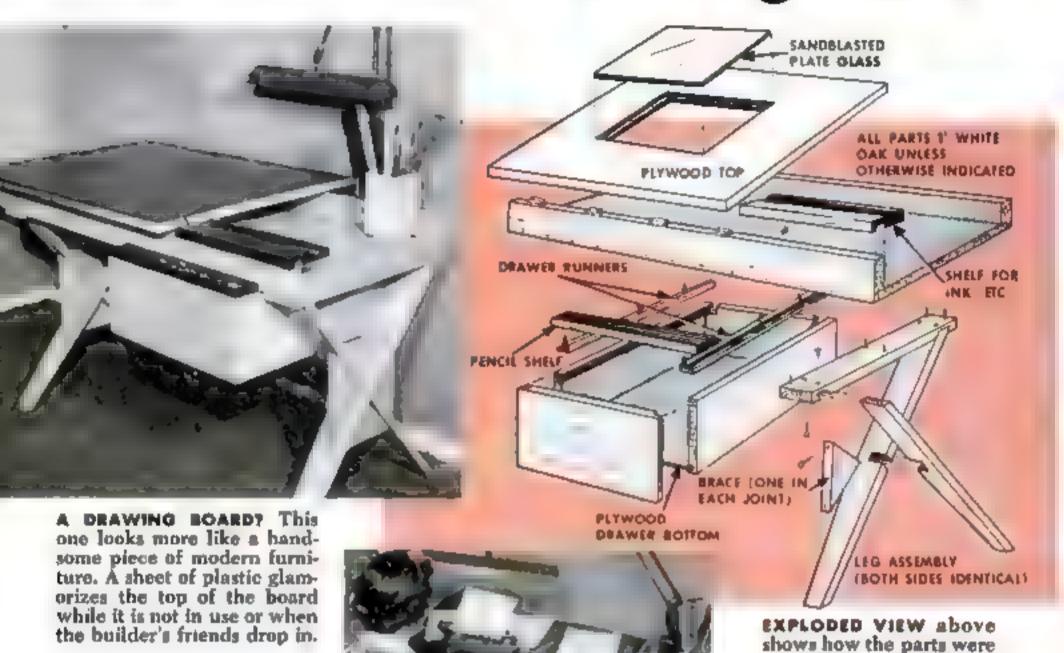




DOUBLE-ENDER, used for suspending bird cages or decorative accessories, needs special treatment because, with its tapered ends, it cannot be removed from solid-metal mandrels. Three steps for winding this spring are shown above. Left, dental plaster molded over steel rod is turned to desired shape. Center, wire is wound over form using gloves to pro-

tect fingers. (Take care, though, when wearing gloves around lathe.) Finally, at right, the spring is removed by cracking plaster out from inside it. Where a number of such springs are needed, clamp numbered washers on a rod and turn them to shape. Then when the spring is wound, the washers can easily be slipped out of coils one at a time. END

### HOW I BUILT A Drawing Board



It's THE FAMILY DESK, too. Keep the board down flat and you have a convenient place for typing, with good light and plenty of room to spread out pages of work.

"ISN"T there something you can do to straighten out this mess? The Joneses will be here any moment."

As a part-time artist struggling along on an apartment-sized desk and the dining-room table, I had to answer this sort of request almost nightly. It didn't take long to find that this arrangement in an apartment was anything but satisfactory. Something had to be done.

My answer is a desk-drafting board. It resembles a modern piece of furniture by day, but can be transformed quickly into a miniature studio by night, Best of all, the transition back to its daytime dignity is accomplished with a minimum of effort

assembled. A rabbet just as deep as the thickness of the plate glass brings the glass surface flush with the drawing-board top. The finish is in keeping with modern furnishings in the apartment.

Many hours were spent in planning the unit. I wanted it to be attractive, and, more important, functional—offering convenient work and storage space, easy access to equipment and quick convertibility. More hours were spent in a workshop transforming the plans into reality. White oak was used for everything except the plywood drawing-board top and the sand-blasted plate-glass window.

To give you an idea what a similar desk could do for you, let's spend an evening watching it in use. Supper is over at seven, and the Joneses are expected about nine. There's just enough time in between to finish some work. So to the drawing board—on the facing page.

### in the Modern Mode By Matt Matthews

It's functional, yet blends with modern furnishings. For an idea of its easy convertibility, look at it in use below.



with only two hours before guests are due to arrive, we decide to put the finishing touches on a couple of pieces of artwork. Casement-window assembly tilts board to position.

RETOUCHING JOB is quickly done, too. For this lamp is moved down to shine under board We have found this tracing window especially useful.

ROLLING BACK the plastic covering uncovers a partly finished drawing still taped to the board. Desired equipment is taken from the deep drawer, where it has been hidden during day.

UNDER THE BOARD, a roomy travlike space gives ample storage area for triangles. T squares, hoards and various art materials which are always a problem. A Bit OF AIRBRUSH WORK is next in order. The board is ideal for this—equipment at the right and nothing to shift around when the board is raised to vertical position for spraying.

HERE COME VISITORS. And quicker than you can say. Please don't look at the mess," the board is covered, equipment is in drawer, room is shipshape.



Has some of your overhead plaster loosened from the lath? Here's how to avoid a costly replastering job.





UNDERSIDE repairs to a sagging ceiling call for more patience than work. Cut enough 1" washers from tincan stock to spot them at 8" intervals.

Punch holes in the washers for wood screws and pound indentations around the holes to countersink the screwheads. Starting at the perimeter of the sag, drill holes through the plaster and into the lath, Insert the washer-backed screws in the holes and draw up on them until the washers just touch the plaster. Repeat until you get to the center of the sag. Go back to the perimeter and, again working inward, draw up on the screws a little at a time until each washer is flush. Roughen the surface of the now firm ceiling, and spackle to hide washers and cracks.— John H. Seval, Prattsburg, N. Y.

Topside repairs are easy when sections of a plastered ceiling in a room below a floorless attic start to sag. Take a piece of %" plywood larger than the section that has broken away from the lath and cover its top surface with wax paper. Then, using a stout prop, shove the plywood up from below until it forces the plaster back in contact with the lath. One of the older types of auto jack, set under a notch cut in the bottom of the prop, will give you the muscles for the job where large areas of plaster must be raised

Make sure the prop is firm. Then go upstairs with a broom and vacuum cleaner and remove all loose debris above the sag. Saturate the area with a strong solution of one of the water-soluble plastic resin glues. Leave the prop in place for a day or two. Then remove the board and you will find the plaster well bonded to the lath. Strip off the wax paper and fill all cracks with spackle. Sand and refinish.—Roy L. Clough Jr., Bristol, N. H.



What you should know about

### Your Car's Wiring

You can avoid costly electrical failures by learning where and how to nip trouble in the bud.

#### By E. F. Lindsley

TAKE a complicated electrical hookup and a bunch of fairly delicate instruments, wrestle them into unlikely shapes and corners, shake the daylights out of them in all sorts of weather—and you've got the deal you give your car's electrical system in everyday driving. You also have an inkling of why electrical troubles rank so high on the service calls tallied up each year by the AAA.

Your chance of adding to these statistics will be reduced if you take a few simple precautions. These should include an electrical tightening-up and frazzled-



A CLEAN BATTERY with secure connections is first step in preventing an electrical breakdown in your car. Baking-soda-and-water paste will remove corrosion from terminals.

The Right Fuse in the Right Place

wire-hunting expedition twice a year—ideally at the fall and spring change-over. For the first check, however, the very best time is the day you bring the hack, new or old, from the shelter of the dealer's mothering wing to your own driveway.

If you were sharp enough to save a box of spare fuses in the trade-in, don't count on the cute little things too much. Fuses come in different ratings, lengths and diameters, so the old ones may be distinctly frustrating some dark night on the highway. The best check is in the car owner's guide, at the original dealer's, or in the fuse maker's index.

This is also a good opportunity to find out if your car has an automatic circuit breaker in one or more circuits. These don't call for fuses, but pop on and off, or simply buzz, until the short circuit or overload is located and repaired.

#### Nighttime Sports "Finding the Fuse"

Most automobile fuses simply snap in and out of clips a lot less complicated than the snap on your wife's purse. But locating the fuse under the dashboard by the touch system in the dark will never grow into a popular sport. The smart operator takes the time on a bright sunshine-filled day to locate his fuses.

The usual spot for an important fuse is under the dash, often on or near the back end of the light switch. But many minor and accessory circuits have fuses inside the small barrel-type connectors, fairly close to the light or accessory. Look for these tricky beggars where wires have been tucked up into the inner bulkhead of a trunk deck, or look down under the edges of the trunk matting for wires running to accessory lights on the rear.

Never count on a long life for the first replacement fuse. The old one may have simply gotten tired and quit. But more likely a short or bare wire rubbing on the body or frame did the job, and will cause the new one to blow again. Here,



FUSES ARE WHERE YOU FIND 'EM. But most important ones are usually under dash. Buick (above) has a removable access panel that saves working in cramped under-dash space.

the writer prefers the nose method of investigation, smelling shorts out by substituting a piece of metal or a foil-wrapped fuse for the real thing and letting the bad wire get hot enough to make the insulation stink. A few quick whiffs in the trunk, or under the dash or hood, will probably spot the short in a hurry.

Naturally, this method lacks the highest technical approval and is not as safe as a continuity meter. So use some care not to start a fire.

If your car is suffering from hot flashes under the dash, you may have an octopus on the back of your ignition switch. This mare's-nest of meandering wires results from home-installed heaters, defrosters, radios and the like being hooked to the closest hot wire with the idea that when you chop the ignition and walk away nothing will be left cooking to run down the battery.

#### Taking the Wraps Off

Unfortunately, most ignition-switch screws just aren't big enough to digest all these wraps of wire. A better practice would be to clamp one husky strip of metal firmly under the screw and solder the extra leads to the strip so that they can be taped up as neatly as a mashed thumb.



ACCESSORY FUSES often are found inside connectors, like the tubular metal one shown above, which feeds radio juice. Look for such fuses under mats and metal panels in trunks.

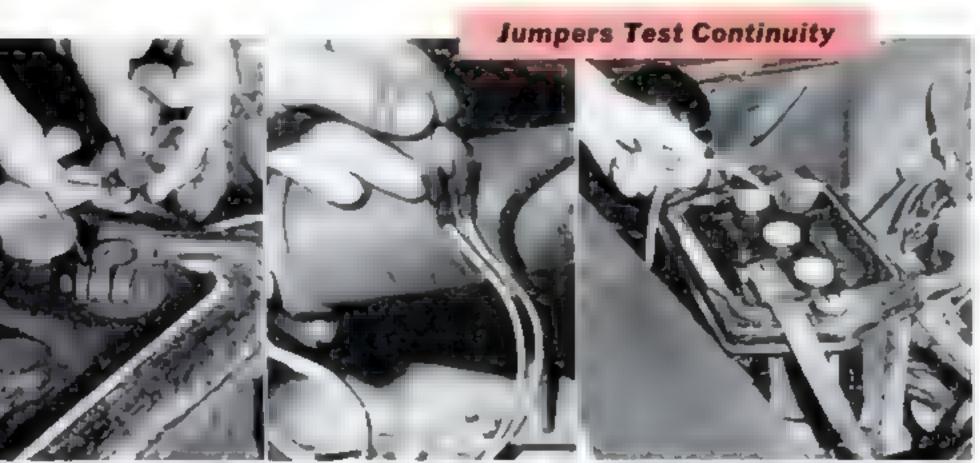
THE RIGHT FUSE will fit and do its job. Wrong one may fail, cause damage, or drive you crazy because it won't slip into clip. Car manual or fuse makers' books list the right ones.

Snugging up an electrical hookup starts at the battery. Very often, this goes for roadside trouble-shooting as well, so the time you spend running down loose terminal screws is a good stand-by education for the time you may have to do it by the glimmer of a cigarette lighter.

No battery is likely to do its best job

with an incrustation of corrosion and crud on it. A fast and reliable wash for this condition it easily made by puddling up a thin paste of water and baking soda. This will remove the whitish crusts and take the fight out of the acid accumulations causing the trouble. Rinse the battery clear when done.

Unless the terminals are obviously in



BOBBY PIN IS HANDY TEST JUMPER. Bulb can be tested across battery by grounding one terminal and jumping from other to hot side of battery. A pin shorted across stop-light leads (center photo) should light tail-end bulbs. If bulbs light on this check, but fail when brakes go on, a new switch is probably needed. Failure to light with the jumper means both bulbs bad (unlikely), or a broken wire or blown fuse.

PLIER HANDLES serve as jumper from hot terminal of battery to body ground. Sparks mean ground cable is at least connected and battery not completely dead. No sparks mean you'd better check woven ground strap in foreground for good connections. Next step: follow hot lead down to big terminals on starter.

first-class condition, you can't go wrong in disconnecting them and cleaning all the contact areas carefully with fine sandpaper.

Install new clamp bolts if needed, snuggle and clamp the connectors on the terminals securely, and coat the connect-

ors and bolts with light grease or Vaseline.

From here on, a fast run-down with wrench and screwdriver, starting at the big terminals on the starter relays and working right out to the light junctions, will probably nip half a dozen loose connections in the harmless stage. Don't forget the connections under the dash, particularly at the back of the animeter, ignition and light switches.

When you're sure all the electrical connections are firmly attached

at the proper places, you can pretty well dismiss from your mind the likelihood of serious failure on the road. Once in a while, however, breakdowns of the "everything went black" variety will stop you cold. If nothing works—lights, starter or any of the gauges—the battery has either fallen out of the car or one of the big cables to the ground, or feeding the system, is broken or disconnected.

#### Pliers Make Sparks Fly

Lacking a jumper lead and instruments, a pair of pliers with the handles spread wide can be compassed across from the ungrounded battery terminal to a bare spot on the metal of the car. A quick flash tells you the ground cable is making contact. No flash means no ground. Play around with the woven ground strap until you find what's loose. Blue sparks tell you to try another flash check at the next logical point—usually the big connection somewhere on or near the starter where the heavy cable from the battery latches on. Make a few tenta-

tive wiggles with the cable and see if any sparks look back at you or if your lights flicker. An all-out failure to produce any juice at all is usually easier and faster to find and fix yourself than it would be to call a repair truck.

Lesser electrical breakdowns such as a

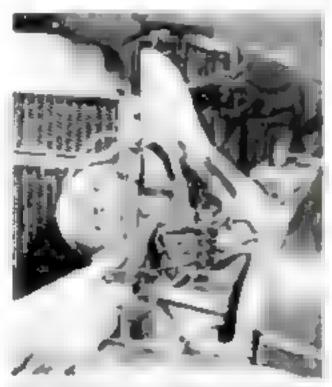
tail-light, headlight or accessory-light failure can, of course, always boil down to a bulb. As a first shot, make sure the light and its socket are firmly seated and grounded. If you tote a variety of junk in the trunk, wires or bulb holders can often get themselves entangled and jerked out by the roots. A next bet for a quick check of the bulb would be to use the pliers or a scrap of wire for a jumper. Touch one terminal of the bulb with the jumper from

the battery or other hot terminal, while holding the second terminal, or base of the bulb, against a bare-metal ground.

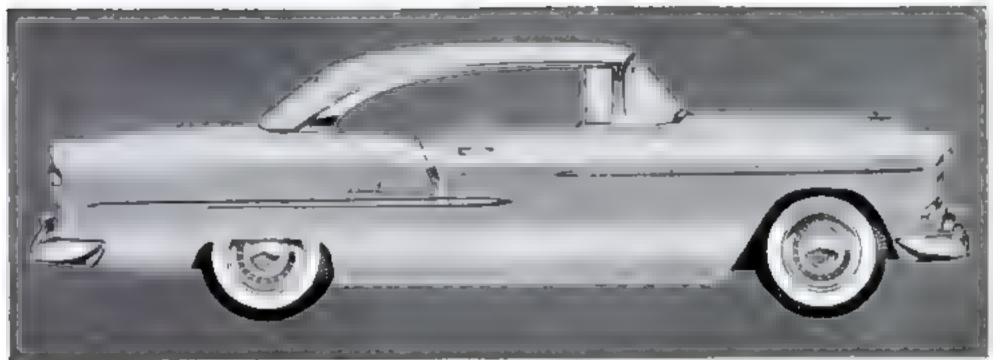
Unless the bulb is a trick one with a shaky filament, lighting up means that the bulb is working. Now clean the end of the lead wire to the light and flash it against a ground. No flash probably means a loose wire or a short and a burned-out fuse.

Directional lights and tail-light stop signals both have an extra gimmick with which to amuse yourself. If directional lights flash on only one side, or not at all, and the wires and bulbs seem to pass inspection, borrow a new flasher unit and see what happens.

The tail-light switch ties in with the hydraulic-brake system. If you suspect its honesty, short across its terminals with a screwdriver. No flash from the screwdriver means no current getting to the switch. Check the wires. If the lights operate with the screwdriver but not with the brakes, you'd better buy a new switch.



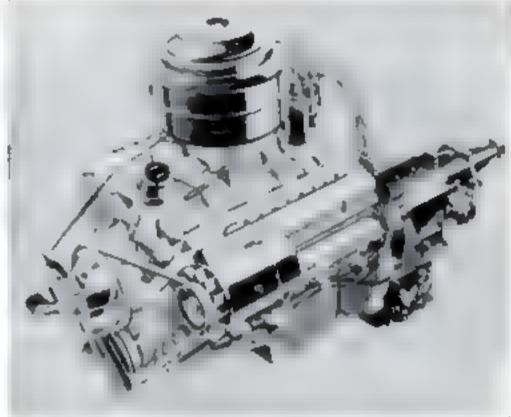
LOCATIONS OF TERMINAL CLUSTERS, like this one near radiator which feeds lights and horn, are handy to know. Some cars use plug-in connections which may sometimes be pulled loose accidentally.



The smartest yet -1955 Chevrolet Bel Air Sport Coupe

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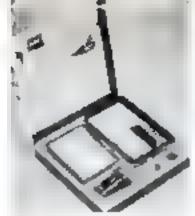


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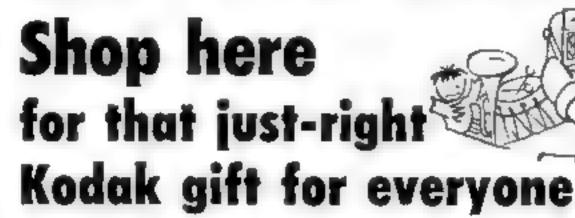
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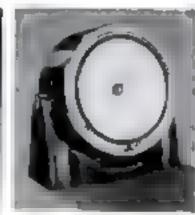
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New darkroom safe. Can be used either from For wall, shelf, bench. Tilting base, minute lomp provides direct or a drop cord or in a wall. Includes switch cord, and split-second hands, room Lump, 55.75.



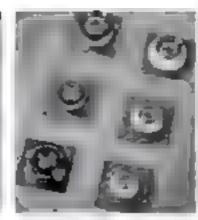
Lamp, \$9.75.



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Cool, circline fluorescent lamp, and integratingsphere lamphouse are prominent features in each enlarger, Kodak Hobbyist Enlarger (left), \$57.50, complete with fr6.3 lens. Koduk Flure-Rto Injurger (right), \$99.50 (land extra).



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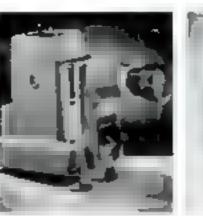


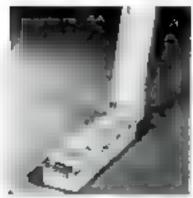


tor (f/3 3 lens) \$72.50. lector, \$23.95.



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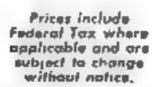
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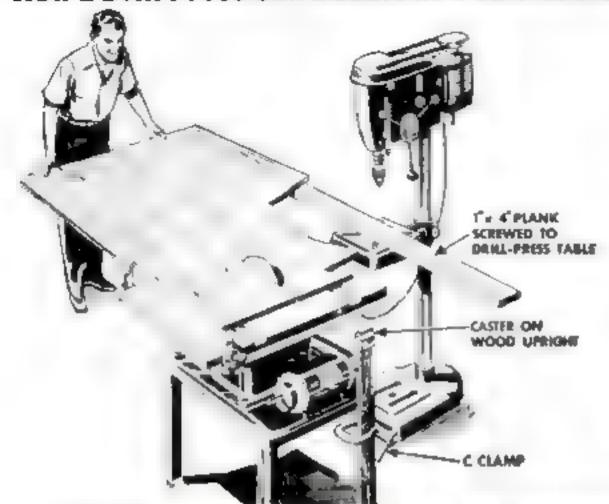
Materials for mounting 50 color transparancies in gloss. Kodak Slide Kít, \$3.63.



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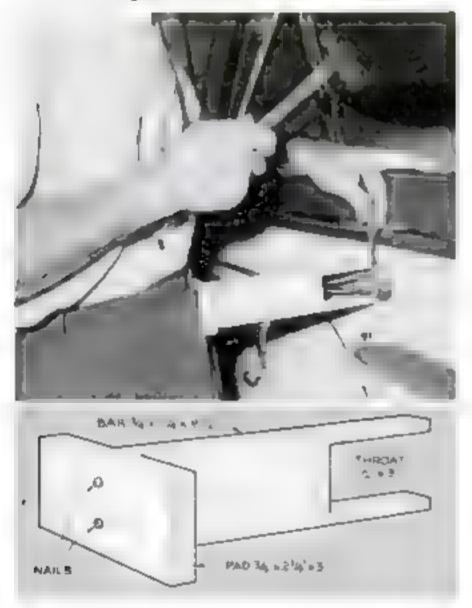
#### How a Drill Press Can Double as a Saw-Table Extension



WHEN I have a big piece of plywood or wallboard to cut, I move the circular saw close to my pedestal-type drill press and set the drillpress table 1" lower than the saw table. Then I fasten a long strip of one-by-four to the top of the drill-press table with a screw and washer. from below. I clamp a second strip to one of the back legs of the saw table. This strip has a caster at its upper end. flush with the top of the saw table.

The additional supports make easy work of 4'-by-8' panels—Lieut, John C. Martin, Kings Point, N Y.

#### **Tool Helps Service Car Doors**



Installing upholstery covers and servicing auto locks and window lifters calls for the removal of window cranks and door handles. This simple wooden tool makes the job easy.

Place the end against the garnish ring and press against the pad with your hip. The pin or horseshoe lock is thus exposed, while you have both hands free to remove it.—Ivan Grosvenor, Indian Rocks, Fla.



#### Turps Cans Carry Sorted Nails

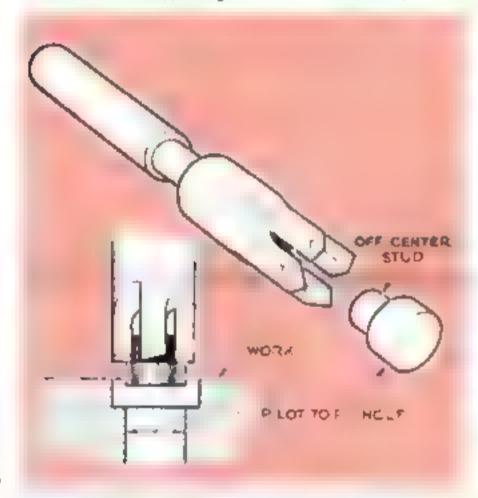
These handy nail bins, made from gallon turpentine cans, can be carried right to the job without transferring their contents to other containers. Cut away one corner of each can along a 45° diagonal starting about %" above the handle, then bend in the edges to make a smooth rim.

You can resolder the handle closer to the edge, as above, or use the type that has an off-center handle and leave it in place. Painted different colors, the bins will show you at a glance just where each nail size is.—Daniel I. Hadley, Kensington, Md.

#### **Blotter Cleans Typewriter Keys**

To CLEAN the keys of a typewriter before cutting stencils, or if you want good clean copy in regular typing, put a sheet of blotting paper in the machine with the typewriter set for stencils and use each key half a dozen times.—John C. Craig, Edmonton, Alberta.

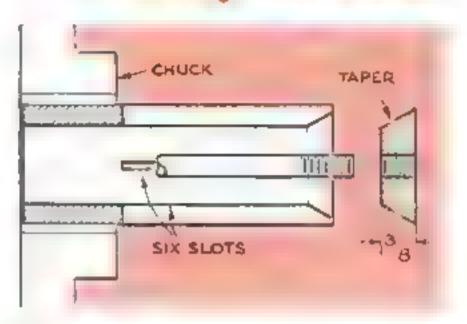
Collet Grips Tubing. Machining thin walled tubing without crushing it in the chuck jaws is made easy with an expanding collet. Cut slots in a piece of slightly smaller tubing, taper-bore the end, and



Counterbore Takes Larger Cut. When a counterbore is just a bit too small for a job, you can make it do by creating deliberate run-out with an off-center pilot. Because this puts all wear on one or two teeth, work should be limited to a few pieces.

Turn a pilot to fit the hole in the work Rechuck on this diameter, with a shim under one jaw to throw it off center by half the required oversize and turn the pilot stem to fit the tool. Mount the counterbore on a lathe center or, if in a chuck, with enough overhang to let the cutting end run eccentrically.

### shop Ideas



fit a tapered plug to be drawn in by the regular drawbar or a long bolt. Then turn the collet to a push fit for the work. Expanded against the inside, the slotted tubing will grip it tightly.

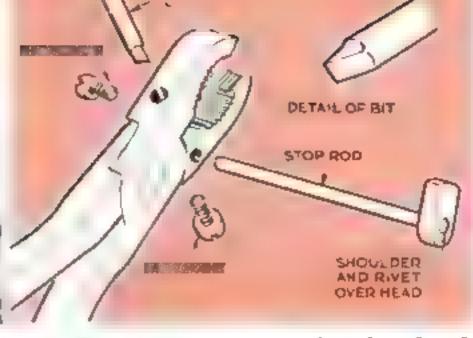


Collar Locates Lathe Work. When a batch of aluminum castings had to be chicked for duplicate turning, their shape made it difficult to position each one the same way. With the plywood collar shown, positioning was automatic and stops could be used for lathe operations.

The collar, notched to fit the work, bears against the ends of the chuck jaws. The casting is pressed against it and the chuck tightened. Then the collar is slipped off.—

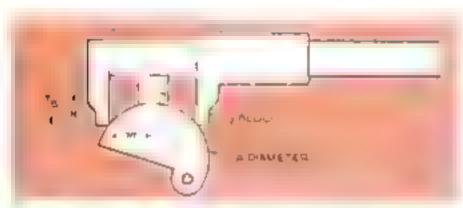
John J. McGuckin, Ridgewood, N. J.





Pliers Cut Off Pins. Pms of any length can be quickly cut from brass rod with these converted pliers. One jaw is drilled to take %" drill shank which has been ground to a V point

The other law is drilled for a stop gauge



Calipers Give Radius of Segments. When duplicating machine parts or other odd-shaped pieces, it is often impossible to determine the radius of some curved surfaces. Using the method below, you can compute radius or diameter from simple measurements.

Place a vernier caliper across as much of the work surface as you can get between its jaws and insert a measuring block of known dimension between the scale and the top of the work, midway between the jaws. Press the caliper firmly on the block and close the jaws on the workpiece. Read the caliper and divide the reading by half to get dimension m. Subtract the thickness of the block from the length of the caliper jaws to get dimension n. Then use the formula  $D = \frac{m^2 + n^2}{n}$  to get the diameter of the workpiece. Divide this by two in order to get the radius.

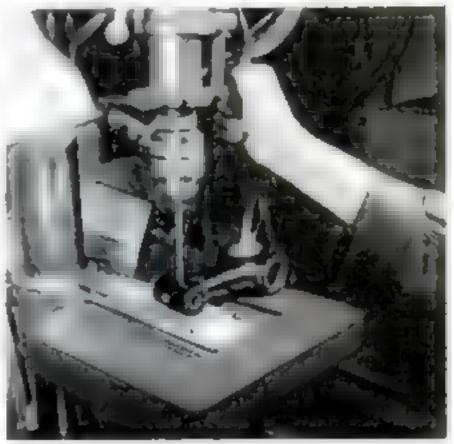
In the example shown, dimension m is .750" and n is .375". So,  $m^2$  is .562" and  $n^2$  is .140". Added together, they make .702". Then .702" divided by n, .375", gives 1.872", or only .003" away from the actual 1%" diameter of the workpiece.

to aid in cutting uniform lengths of rod.

In use, the stop is set for the length of pin needed and the pliers closed over the rotating rod to force the tool bit slowly into it. The rod can be chucked in a lathe, drill press or electric drill.

Save Broken Centerdrills. Grip them in a hand chuck or weld a permanent T handle to one end for use as a reamer or deburring tool for tubing or drilled holes.—Phil McCafferty, Stanwood, loud.





Shingles Level Work. Two pieces of wood shingle placed together so that their tapers are opposite provide an easy means of leveling work for drilling or machining. Sliding the pieces together elevates the work with almost micrometer accuracy.

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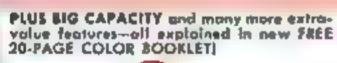


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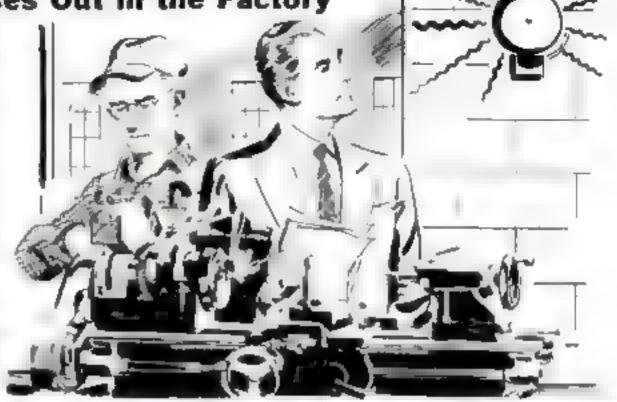
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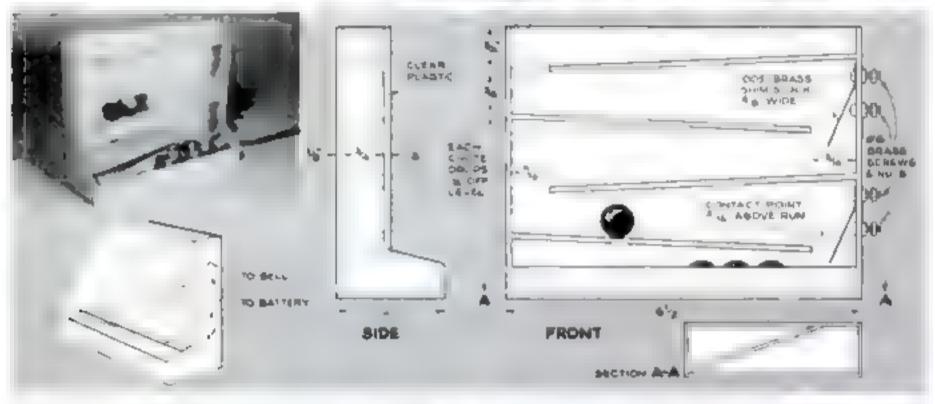
- Please send the free Illustrated booklet "The Greatest Invention Since The Hand Saw" showing how your Power Shop makes me a woodworking expert, saves money in my home.
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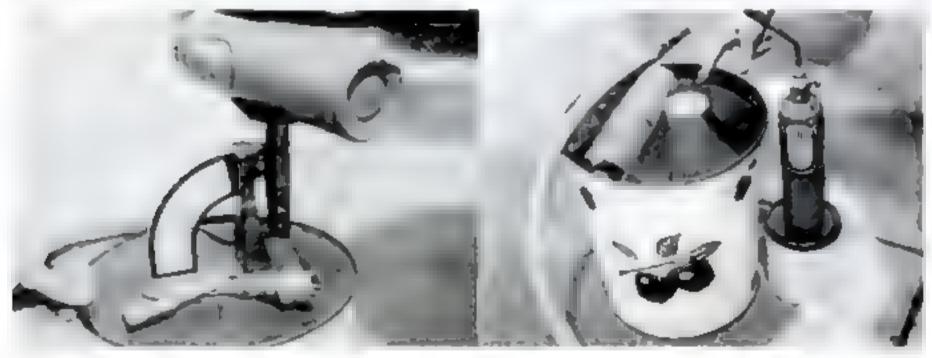
City Zone State

Marbles Page Bosses Out in the Factory

This pinball call box pages roaming executives in a large manufacturing plant. Each boss is given a number and when a call comes in, the secretary in the front office selects a corresponding number of marbles and drops them into the top chute. The marbles must force their way past two light spring contacts to get to the bottom, and in doing so, each marble rings the call bell twice. -J M. Fun, Pittstown, N. J.







## Weighing Shows Amount of Gas Left in Disposable Cylinder

WANT to know if there is enough gas left in a disposable torch tank to do a job, or whether to buy a refill at once? You can't look inside, or feel the contents by shaking. But its weight will tell you.

A full gas cylinder for torches of the make shown (models TX-10 and TX-11) weighs 34 ounces. Half full, it weighs 28

oz., quarter full, 25 oz., and empty 22 oz. Remove the burner before weighing

If you have no scale handy, put the cylinder in water. A full one will float upside down, the end just awash (at right in photo). An empty cylinder floats horizontally, well above the water line.—Andrew Vena, Philadelphia.





# e on car care

How to keep

your windshield

from freezing over

your windshield is one of winter's worst driving hazards and can cause serious accidents. Good way to prevent freezing is to rub a thin film of glycerin on the windshield with a cloth. Be sure to wash off the glycerin film after the storm because it tends to collect rood dirt.



THAT "CUSHIONY" FEELING LASTS LONGER WITH

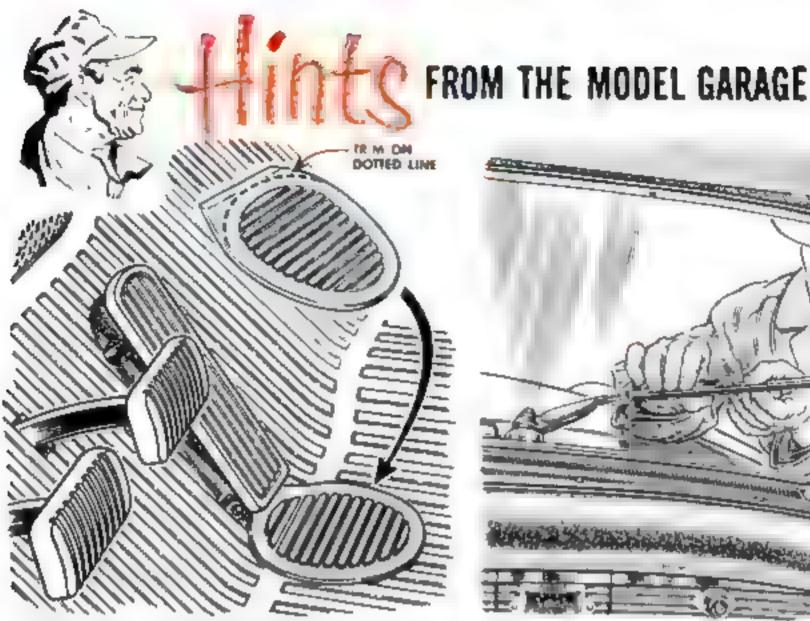
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Texaco Products are also distributed in Canada and in Latin America

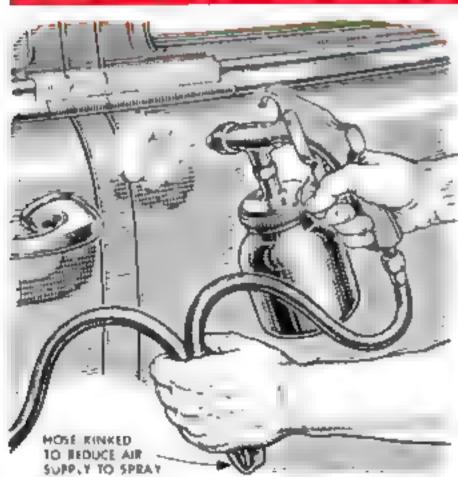
TUNE IN ... TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE on Television ... Saturday nights, NBC.



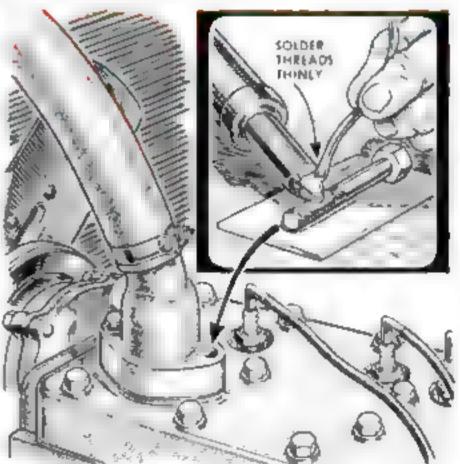
Shoe-sole repair kit, which can be bought in most five-and-dime stores, gives you the makings of a first-rate patch for that wornout section of floor covering under the gas pedal. Trim one of the rubber soles, as shown, and cement it firmly in place.



Caught in bad weather with a wiper blade that doesn't clean the windshield well, try switching it with the one on the passenger's side. Chances are the right-hand blade is in better shape; it gets less mud and sand tossed at it by passing cars.



Save time on touch-up paint-spray jobs by kinking the air hose slightly with the left hand to reduce paint-spray volume temporarily. It's easier than making numerous adjustments on the air regulator to prevent overspray and time-taking clean-up jobs.



Stop leaks around bolt threads that can't be sealed with new gaskets by removing the bolts and floating soft solder over the threaded area with a soldering iron or torch. Leave the first few threads untinned for easy bolt replacement.

# Ask her for the FINEST POWER TOOLS MADE



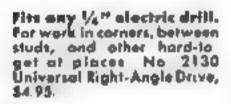


Frester than 10 Mem with Hemdishws.
Millers Falls partable electric saws are powerful, safe, easy to use.
Built in angle and depth adjustments, adjustable ripping guide. No. 600 — a new, fine-quality 6" saw, \$43.50. No. 610, shown — husty, heavy duty 6" model, \$39.50. No. 700 — larger, with full 7" blade, \$67.95.

Mighty useful. There's power to spare for hundreds of jobs with a this rugged new Millers Fads 14 Drill, No. 1814 Drill alone, 522 35 In complete, accessory packed Deluxe Drill Kit No. 8142, 542 25 Other Millers Falls drills from \$19.85 — hits from \$29.95.



Sand and polish with any 1/4" electric drill. Complete with 5" rubber pad, 5" lambswool bannet, two 5" sanding discs. No. 2120 Universal Buffing and Sanding Attachment, 58.45.



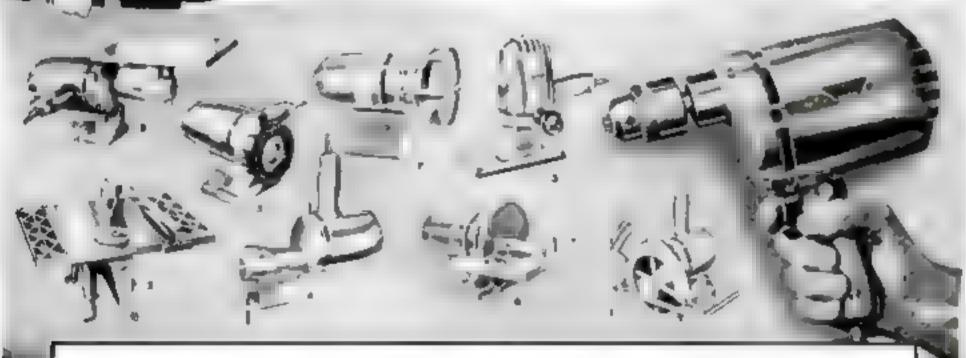
Universal Jig Saw Attachment. Converts any 14 wise true drill into an efficient saw that cuts straight or curves. Copucity 14 in wood, 18" in meta. Needs no starting hate in wood — cuts awn way through. Complete with 4 saw blodes. No. 2140, \$10.95



New "Dyng-Mite" Power Wood Buts with high-speed steel blades Stay shorp 10 times longer ~ even out through wire noils without damage of diameters 2s to 1 all with 1/2" shooks. Singly of Insets, No. 8006 set of 6, 56 45





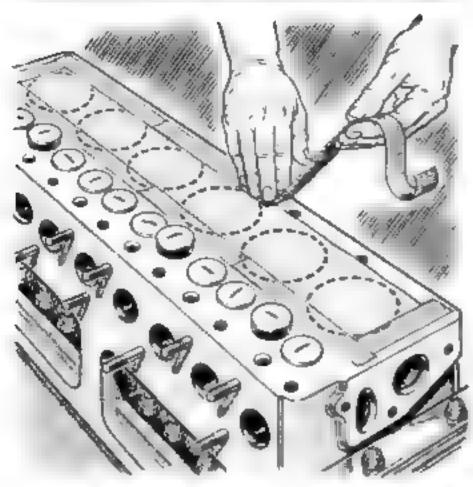


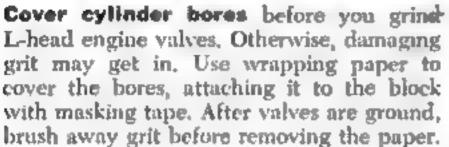
The Start of a Complete Pewer Workshop for Only \$39.95

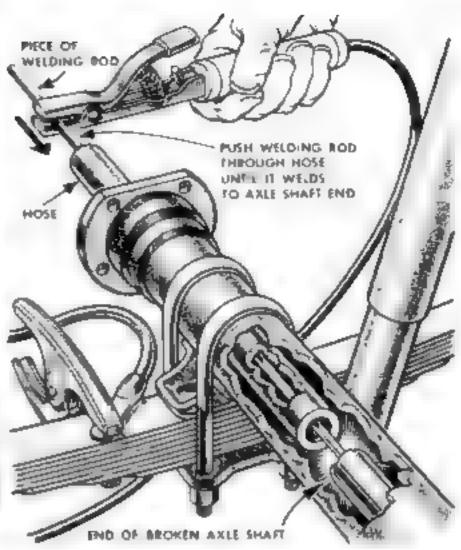
Basic 888 Fower Unit at right comes equipped as a powerful (4.0 amps. <sup>1</sup>a" dri l. 4" disc sander and 6" polisher — \$39.95. It converts into 8 additional power tools by means of beautifully engineered, inexpensive attachments. 1. No. 8811.4" Partable Saw, \$15.95 — 2. No. 883.4" Bench Saw, \$22.95 — 3) No. 882 Orbital Sander, \$15.50.

4) No 886 Fortable Jig Saw \$9.95 - 5 No 881 Bench Stand, \$2.95 - 6, No. 889 6" Disc Bench Sander also requires No 881 Stand, \$7.95 7, Na 8810 4" Bench Grinder also requires No 881 Stand), \$5.95 - 8) No. 887 Jig Saw Table (converts No. 886 to Bench Saw), \$1.75. Special Bulletin at your hardware stare or an request

## MORE Hints from the Model Garage



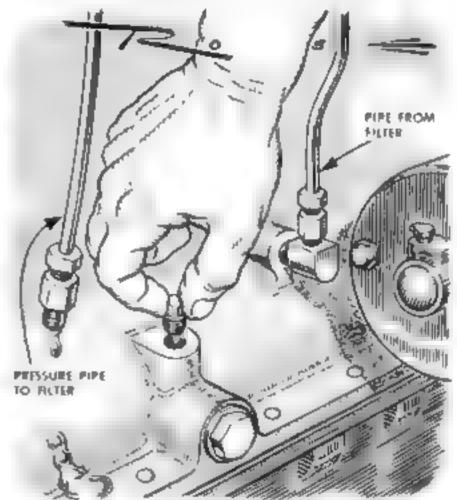




Use welding rods to remove broken axle stubs. Tack two rods end-to-end, Clip one electric welder clamp to a rear spring, the other to the rod. Make a pass at the stub through a piece of garden hose. Welded to the rod, the stub is pulled out easily.



Locate hard-to-find engine knocks with a homemade stethoscope. Make a right-angle bend near one end of a curtain rod, and solder this end to the bottom of an oil can. Probe the engine block with the rod, holding the can mouth to your ear. Diaphragm-amphfied sound is easily spotted.



The right-size pipe piug, stored in your car's tool chest, can save you a lot of trouble if a bypass-type oil filter or its lines develop a leak out on the road. Remove the inlet tube where it couples to the engine block, insert the plug, and your emergency repair will get you home.

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Or-osk for the Della accessory you've been scroll saw, shaper or lothe. wanting for the Delta Tool you already own. See your Delta Dealer the s listed in the classified pages of your phone book under "TOOLS" or "MACHIN-ERY ), or write for catalog to: Delta Power Tool Division, Rockwell Manufacturing Company, 504M North Lexington Avenue, Pittsburgh B, Pa.

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QUALTY P WER TOOLS Another Product by

Rockwell

[Continued from page 152]

turn around and she won't back up." Under Gus's coat, he caught a glimpse of red. "Hey," he said, "you really are Mr. Santa Claus tonight, aren't you?"

The little car stood on a side road that led steeply down from the highway to a gravel pile the highway department had put in reserve for the winter. Gus parked on the highway shoulder, put out flares, walked down toward the car with a small tool kit in his hand. Softly falling snowflakes fluttered in the flash beam like moths.

The bumper of the car was hard against the steep side of the gravel pile. There was no room to turn around, but no reason, as far as Gus could see, why the car couldn't back out.

## On This Night-No Easy Way Out

"I could tow you out, sailor," Gus said grimly, "but I won't. There could be a lot of uses for reverse gear on a night like this in a hundred miles."

Gus started the motor, put the car in reverse, eased up on the clutch. The motor took hold of the load, started to move the car back, and stalled. Good Lord, Gus thought, even this little engine should have more power than this. He tried several more times to back out, but each time the motor killed when it took the load. He got out, raised the hood, and worked the throttle linkage. The motor opened up from idle to high speed with a throaty roar.

Gus turned his flash on his wrist watch. He had just 25 minutes to get on the schoolhouse stage. He felt a rising of panic, shook it off. No man, he thought, could think clearly with his wind up. Calmly he pulled out his pipe, lit it.

Once again he got in and tried to back the car out. When the motor died he leaped out, thrust his head beneath the hood, nostrils expanded. He detected the faint but unmistakable odor of ozone, that distinctive smell that indicates electricity in the air.

"Aha!" Gus called. "You try backing

her out, Wilder."

Gus sheked off his flashlight beam. This time as the engine died Gus saw a flash of spark at the rear of the engine block.

"Try her again," he said, playing his

flash on the spot.

With the next try in reverse, Gus saw the little motor twist on its mountings under the strain. With the ear on a downgrade, the back end of the block tilted just enough so that the oil-gauge pipe came against one of the primary circuit connections of the coil on the fire wall, short-circuiting the ignition, Gus bent the pipe forward a couple of inches. Then he put down the hood and leaned inside to speak to Wilder.

"Don't tell that kid of yours, sailor," he said, "what a dumb mechanic you ran into down the line. You can roll now."

A big grin came over the sailor's face. He shifted into reverse. Under the guiding beam of Gus's light, the httle car backed stoutly up the grade to the highway.

"Thanks a million, mister," Wilder said, leaning out, the snowflakes falling on his face. "The kid will be asleep. Think I should wake him up, or just fill his stocking and let it go until morning?"

## Only Minutes to Curtain Call

"If it were me," Gus said, "I'd wake him up. A year is an awfully long time to a kid."

"You said it," Wilder remarked. He

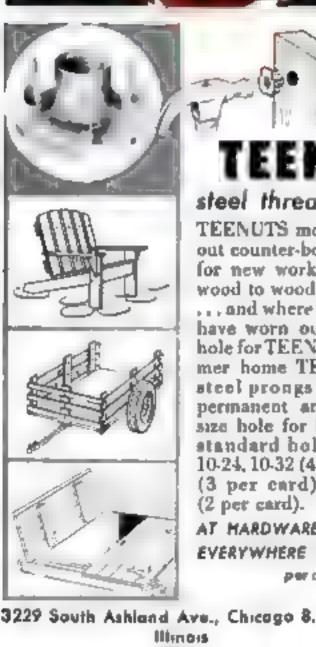
shifted gears and was gone.

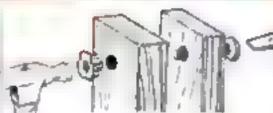
Gus stood there a moment, looking after him. His coat was sprinkled with snow, giving him the look of a shaggy bear. Then he was running to his car, dousing the flares, getting under way. As the car shot forward, he glanced at the dashboard clock.

"Eight minutes," he said aloud, "to make three miles and get on that stage. Santa Claus may be a few minutes late, but those kids see their fathers every day."

NEXT MONTH: Gus absolves the little green men.







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TEENUTS mount flush without counter-boring. Excellent for new work or repairs . . . wood to wood, wood to metal ... and where old screw holes have worn out. Simply drill hole for TEENUT harrel, hammer home TEENUT and its steel prongs provide rigid, permanent anchorage. Same size hole for bolt. Sizes to fit standard bolts: 6-32, 8-32, 10-24, 10-32 (4 per card), 4-20 (3 per card), 710-18, %-16 (2 per card).

AT HARDWARE COUNTERS EVERYWHERE 154

THE

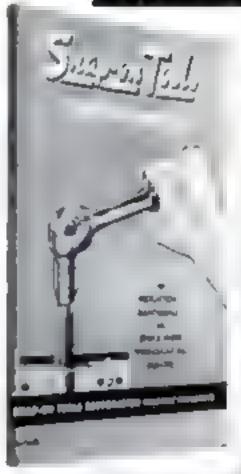


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4-IN-HAND (upper) is a file-rasp that gives you a choice of four different material-removing faces: Half Round file and Half Round rasp on one side, Flat file as d Plat rasp on the other. For wood, metal, leather, plastics, etc.

HANDY FILE (lower) is double-cut on one side, single-cut on the other—for by th roughing down and smoothing. Also wonderful for sharpening edges of many kinds of cutting tools. Forged-on handle with handy hang-up hole.

Amateur and professional craftrmen who pride themselves on a representative collection of fine tools invariably prefer Nicholson or Black Diamond when it comes to files. Hardware dealers are equally proud to sell them.

## Two "musts" for the make-it-yourself hobbyist



NICHOLSON FILE CO., 19 Acarm St., Pravidence 1, R. L. (In Canada, Nichotson File Campbry of Canada Ltd., Port Hope, Owtaca



## Toolmaker's Museum on Wheels [Continued from page 92]

Mexico. For the last 10 years he has managed his far-flung enterprises by remote control from an office atop his Montecito mansion. He makes monthly factory visits and uses his office in the administration building in Des Plaines, Ill., three months of the year to get "reinstated with the employees as the guy who runs things."

## Business Is Better With the Boss Away

"But actually I don't know what's going on when I'm there," he confides. "I'm more in touch with everything when I'm in California, with daily reports flowing in from all the factories and stores, and with time to digest them and formulate future policies. The business runs much better when I'm away from it. That's because it's human nature, when the boss is available, for department heads to drop in for confirmation on matters that should be weighed and decided in the light of specific considerations on which it is their function to be more fully informed than he."

Staying in the office may handicap the Wilkie clan more than some young executives, because they seem to be constitutionally incapable of closing their minds to suggestions.

## Plastic Revealed Inner Workings

When Plexiglas first came out, and before even the manufacturer knew much about how to handle the new clear plastic or what to do with it, the Wilkie boys duplicated a DoALL bandsaw machine in the transparent material to demonstrate its inner workings. Such exhibition models are now common.

The Wilkies were also among the first to use 3-D for sales promotion, packaging slides of their entire line, with a viewer, in a miniature replica of a DoALL.

Since there are no ignorant stockholders in the Wilkie corporations to ask "What happened to the last dividend?" the brothers have on occasion indulged

[Continued on page 234]



Andy Phillips says: MyBELSAW Sharp Smith gives me big profits at low expense — I can tun 35 to 40 circular saws in an 8-hour day — that makes me \$40 cash."

"I also get BIG EXTRA PROFITS .. up to \$4 an hour by grinding planer and jointer knives - there's always a

You can start this REPLAT CASH business in your own home or garage while you are working at your regufor itself from just 65 jobs." - Harvey Jensen

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**NEW from BLACK & DECKER** 

## Christmas Tool Chest for Giving or Getting!

Here's a brand-new B&D Electric Tool Chest in a gift-carrying case, Includes 34" drill, 7 drill bits, 3 sanding discs and backing pad, polishing bonnet, wire cup brush and paint nuxer. Contains everything needed to make home jobs easy! A \$31.25 value! Special

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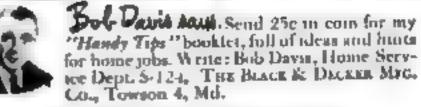
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## Toolmaker's Museum on Wheels

[Continued from page 232]

their scientific curiosity on a heroic scale.

They dropped a tidy \$350,000 in building and equipping a mill for molding powdered metals. Once they even tried to precipitate gold out of sea water, but stopped when they realized they were precipitating more gold out of their pockets than out of the ocean. This did not stop them, nevertheless, from subsidizing research on harnessing solar energy to reclaim sea water for irrigation.

Right now they have their fingers crossed as soap companies test pilot models of a new micro-processing machine that they developed which may antiquate present methods of making soap, rubber, plastic and chocolate—or may be just another item to shrug off with, "Well, we tried."

## Fast-as-Light Farmer Shows Size of Universe

A FARMER could plow a furrow from the earth to the sun in eight minutes if his tractor moved as fast as light. Continuing at that speed, he would plow through the last dust fringes of the outermost coinct known in just eight bours.

So says Dr. Clarence H. Cleminshaw of Griffith Observatory, Los Angeles, who worked out these examples to illustrate the vastness of the universe.

Sticking to an eight-hour day, the farmer would have to furrow at light's speed for about 13 years before he reached the end of his field, or the nearest star, Alpha Centauri, which cannot be seen from most of the Northern Hemisphere.

The distances to stars are commonly expressed in light years, or the distance covered by light in one year. The speed of light is 186,000 miles per second and one light year is equal to nearly six trillion miles.

That part of space at which the 200-inch telescope atop Mt. Palomar in California can peer includes galaxies that are about two billion light years distant. Galaxies are so far away that they look like points of light to the naked eye, yet they consist of myriads of stars separated by much greater distances than the field plowed by the farmer as he furrowed from the earth to the nearest star.



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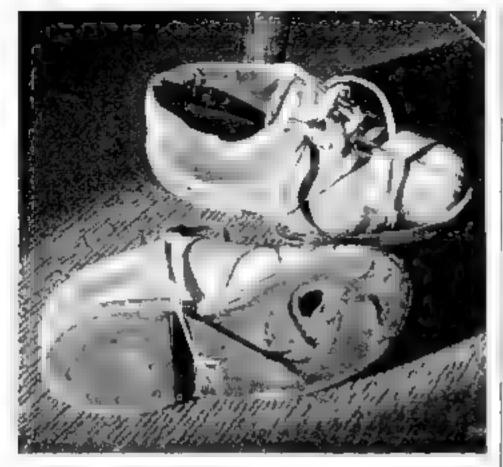
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## HASTINGS

STEEL-VENT PISTON RINGS



## Mercury Grows Faster and Sleeker [Continued from page 128]

ble torque at the low end of the speed range without hurting at the upper end. The fuel pump is inverted, and larger; the manifold heat valve is changed to fit the new exhaust system; and there is better exhaust-valve cooling.

Not thirsty. The big engine doesn't promise to swill down gas, provided you don't get carried away by the delights of lead-footing it. For one thing, rear-axle ratios have been tailored to suit (3.15 in place of 3.54 in the automatic, for instance, and 3.73 in place of 3.92 in the manual-shift car).

In the gearbox department, you have a pick of manual shift, automatic, or over-drive. The automatic, in common with that in the new Ford, Lincoln, and Thunderbird (Oct., p. 131), has a cute gimmick: a throttle-triggered automatic downshift to low for show-off getaway. Total torque multiplication at stall, with the accelerator on the floor, is 5.12-to-1, which is ample to screech the tares, flex the passengers' heads backward, and sensitize any cop within 100 yards.

More practically, the automatic has noticeably "smoothened-up" shifts. If you are whistling along in Drive at 50 m.p.h. and suddenly come to a brisk downgrade. you can calmly pull the lever to Low for extra hold-back. At this speed the transmission goes to intermediate, not low (changing from a 1-to-1 to a 1.46-to-1 ratio) and gives you considerable but not convulsive retardation. Then, if your speed subsequently drops to around 24 m.p.h., the box steps down to low (2.4to-1). Once there, it won't upshift, however steep the grade, until you reset the lever. Neither shift produces a major commotion-they're of about the same magnitude as a power kickdown.

In summary, then: the vintage looks promising for 1955.—Frank Rowsome Jr.

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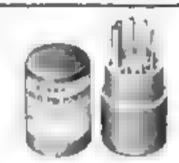
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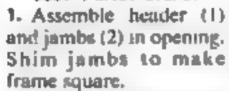


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## A Net to Catch the Northern Lights [Continued from page 183]

Sydney Chapman of the University of Oxford and Dr. D. F. Martyn of Canberra, Australia,

The Chapman-Martyn theory holds that during sunspots, solar flares, and perhaps other solar disturbances, quantities of the sun's gases hurtle outward in great jetlike streams, much as water is propelled from a garden-hose nozzle. These streams are composed chiefly of hydrogen atoms, the simplest of all atoms; each consists of one proton carrying a positive electric charge and one negatively charged electron.

From time to time, as it travels in its orbit around the sun at a speed of 18 miles per second, the earth is bombarded by one of these atomic streams, Then auroras glow, compass needles dance, and long-distance communications circuits break down. But the stream of atoms from the sun does not enter the earth's atmosphere directly, for the earth is protected by a magnetic "shield" which acts as a barrier deflecting the incoming solar atoms. When the incoming stream hits this shield, at a height of many thousands of miles above the equator, it divides into two streams and flows around the shield-much as a stream of water flows around a rock or other obstacle in its path. Positively charged particles go around the equator in one direction and negatively charged particles in the other. A doughnut-shaped "ring current" of particles is thus built up, circling the equator, thousands of miles up.

## Auroral Current Circles the Globe

Once the particles enter the ring current, they continue to travel around and around the earth in it, perhaps for days. From time to time, however, particles leak out of the ring, so that the current, gradually "decays." It is these particles leaving the ring which chiefly explain radio blackouts and other communications vagaries

Careful calculations show that the

[Continued on page 210]

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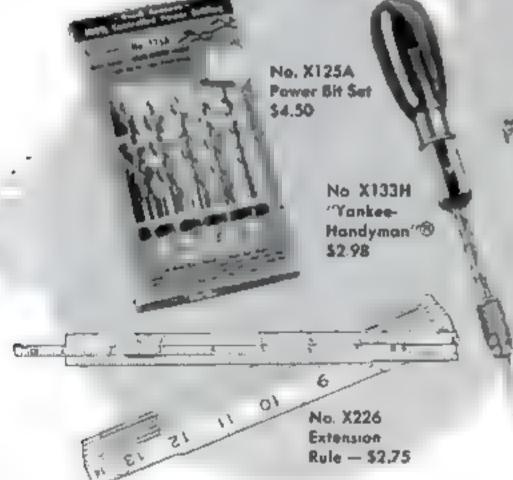
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## A Net to Catch the Northern Lights [Continued from page 238]

magnetic lines of force above the equator inevitably guide the escaping auroral particles toward the earth, usually in the vicinity of the auroral zones. There the particles collide with the nitrogen and oxygen atoms in the atmosphere—and the energy of the collisions produces the auroral glow.

A fine theory, you may say—but is it true? Credit for confirming important parts of the theory goes primarily to Dr. A. B. Meinel and his associates at the University of Chicago's Yerkes Observatory in Williams Bay, Wisconsin, Dr. Carl W. Gartlein of Cornell University achieved similar results with his National Geographical Society spectrograph.

Dr. Meinel took a small airtight chamber filled with ordinary Wisconsin air from which the dust and moisture had been filtered, and then pumped most of the air out of the chamber so that what remained was as thin or "rarefied" as air at a height of 60 miles or more, where the aurora glows. He then bombarded this rarefied air with a thin beam of positively charged hydrogen particles. The air in the chamber glowed—and study of this glow with a spectrograph showed that it was quite similar to the glow of the quiet arc-type aurora.

But something was missing from the artificial glow. Hence, Dr. Meinel and his associate Dr. C. Y. Fan repeated the experiment, but this time they bombarded the rarefied air with positively charged particles of helium—the second most common element on the sun. Sure enough, bands of light missing from the previous glow appeared.

## Scientists' "Net" May Pick Up New Facts

Scientists now believe that study of the aurora may tell us the answers to such questions as how far upward our atmosphere extends, what gases it contains at various heights and how its temperature varies from level to level. It is to secure answers to these and many similar questions that auroral studies will be in-

[Continued on page 242]

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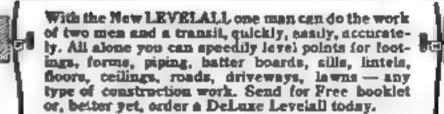


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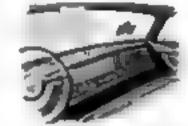
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## A Net to Catch the Northern Lights [Continued from page 240]

tensively pursued from now through the next peak of auroral activity, 1957-58. That is also the period of the International Geophysical Year (IGY).

One feature of the auroral net will be a string of observation posts circling both the north and south geomagnetic poles. There also will be a pair of stations, one at College, Alaska, and the other on MacQuarrie Island in the Antarctic, located on a single "magnetic line of force," Simultaneous observations at both ends of this magnetic line will determine the difference, if any, in the paths of the auroral particles as they travel northward and southward from the equatorial ring.

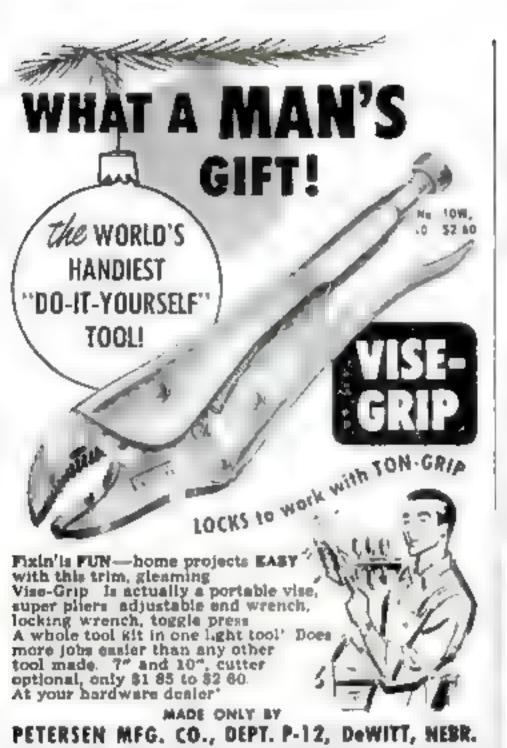
## Rockoons Will Aid in Research

Plans call also for the use of powerful Aerobee rockets, capable of climbing right up into an aurora; 25 Aerobees carrying instruments for auroral study and other research projects will be launched from Churchill, Canada; and another 11 from Alamogordo, New Mexico, Thirty-seven "rockoons"—small balloons which rise up into the stratosphere and there release rockets capable of carrying instruments higher still—will be launched in Canada, Alaska and Greenland, Other nations in the IGY are planning similar rocket researches.

At Cornell University and at the University of Alaska, trios of radio telescopes will be aimed through the Northern Lights at distant stars. The purpose is to determine how radio waves emitted by these stars are affected as they pass through an aurora. Perhaps some kinds of waves will be found which can penetrate an aurora without difficulty; such waves might prove useful for Arctic communications or for radar work.

Visual observations of auroras in the United States and Alaska will be concentrated at 30 stations equipped with special filters which admit auroral light but block out light of other kinds, thus increasing the accuracy of auroral observa-

[Continued on page 244]



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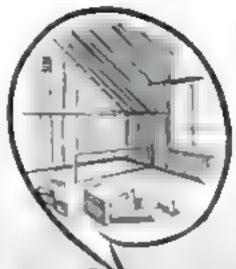
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244 POPULAR SCIENCE

## A Net to Catch the Northern Lights [Continued from page 242]

tions. An additional 70 portable filters of this kind will be lent to scientific volunteers—especially airplane pilots flying over unfrequented portions of the earth's surface, and amateur scientists in the northern United States and in Alaska,

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Scientists of the nations cooperating during the IGY will seek, among many other objectives, to prove or disprove the theory that meteorological disturbances in the far Antarctic profoundly modify the weather here in the Northern Hemisphere. They will seek to determine whether the continents are in fact stationary, or are slowly drifting farther apart or closer together. Glaciers and polar ice caps will be measured to see how much they have melted since the last checkup in 1932-83; preliminary evidence suggests that the ice caps are melting fast enough to make the Arctic Ocean navigable within another 25 or 50 years Enough water is held captive in these ice caps to raise the level of the world's oceans by a hundred feet or more; and geophysicists are naturally curious to know how soon, if present melting continues, the rising oceans can be expected to inundate low-lying coastal areas and great seaboard cities. These and other IGY projects will no doubt make headlines for years to come-but few IGY discoveries will be awaited by scientists with more eager interest than the news of what is being caught in the IGY net spread to catch the aurora. THE END

## Do Porpoises Use Sonar?

Porpoises may use sonar to navigate and to hunt for fish for food, say scientists of Florida State University. A dozen of the seagoing animals were tested in a pool and found to respond to underwater sounds of extremely high pitch—50,000 cycles and more (humans can't hear beyond 20,000). This discovery, coupled with the fact that the porpoise's brain has an unusually large section devoted to hearing, suggests that the porpoise sends out ultrasonic pulses, then listens for the echo in order to locate fish and other obstacles in its path.

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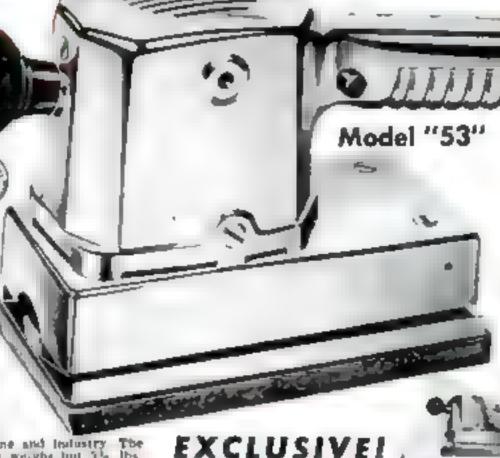
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246 POPULAR SCIENCE

## These Cars Made a Hit in Disguise [Continued from page 134]

vere trials under cover of 1954 bodies.

Stop-and-go experiments on mountain grades near Asheville, N.C., had tested the mettle of '55 axles and transmissions. Speed and temperature trials had been made on sizzling, floor-flat desert roads near Brownsville, Tex. Pike's Peak had challenged Dodge and DeSoto hill-climbing powers and brakes, had demonstrated altitude effect and vapor-lock conditions.

The most-discussed change on the 1955 models came about almost by accident.

## Stylist's Idea Made Engineers Happy

Many months ago, in the course of creating a clay instrument panel for a full-scale mock-up of the proposed 1955 Chrysler, Cliff C. Voss, head of Chrysler's styling studio, had the sudden urge to see how the automatic-transmission selector would look on the dash instead of the steering post. It looked so good there that the chassis people were asked to find out whether or not the change was practical. They happily reported that the linkage would be simpler and less expensive than before.

To show the top brass, Virgil M. Exner, Chrysler's director of styling, had a sample mechanism put in a 1954 Chrysler.

The new arrangement was an instant hit on the loftiest of corporation levels, and the order went out to make the change in the whole darned family of cars—Imperial, Chrysler, DeSoto, Dodge and Plymouth—for 1955.



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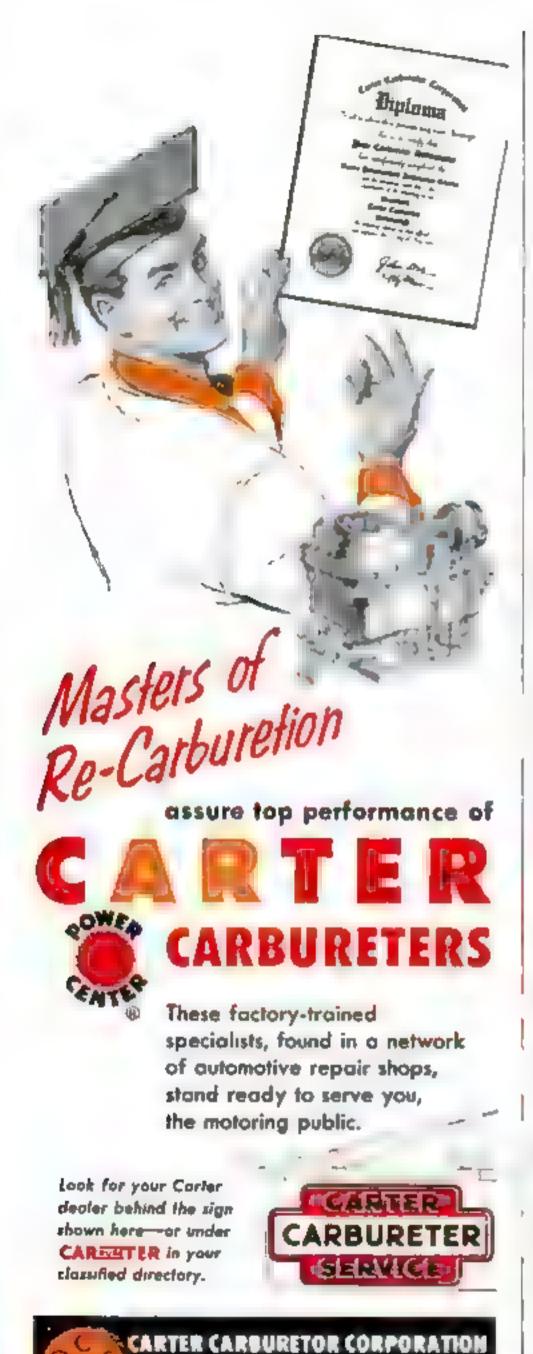
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## The Ford-Plymouth-Chevrolet Story [Continued from page 122]

joint suspension has been tilted some three degrees to the rear.

Plymouth, while staying with 10-inch brakes on six-cylinder models, has gone to 11-inch drums on the front wheels of V-8s, and 11-inchers all around on station wagons. The new frame provides a big 2.56-inch increase in front-wheel tread, to help stability and cornering. There's a new steering linkage and gear that, sadly, costs some increase in overall steering ratios. Plymouth has new shock-absorber locations, more body mounts, and rear springs that are 25 percent wider than last year's

Chevrolet, having already had 11-inch drums, makes only touch-up brake changes, aside from adopting a suspended pedal. Like Plymouth, its front-wheel tread is also wider, by 1.3 inches. In a major change, it has gone to ball-joint front suspension, which eliminates the troublesome kingpin and greatly reduces the number of grease points. (Chevvy prefers to call it "spherical joint," at least until the tongue slips.)

They've added a neat wrinkle: On a hard stop, braking torque from the front wheels is led into the suspension in such a manner as to counteract the tendency of the car to dive. The result is most apparent in those trafficky situations where sudden braking can make some cars bow like eircus horses. Chevvy still dips, but much less.

Engineers' enthusiasms. Some features in particular seem to please the engineers at each company. Ford people, for instance, like to mention an improved cooling system, with a higher-capacity pump and a new 14-pound pressure cap that won't "hunt" between atmospheric and rated pressures. They're confident they've licked some 1954 headaches, notably camshaft metallurgy and oil gaskets. They suspect that the modified automatic transmission—like Thunderbird, Merc and Lincoln, it has a new getaway kickdown for showy two-shift starts—may give an edge in the stop-light steeplechase.

[Continued on page 250]

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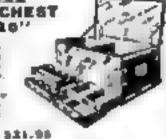




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## The Ford-Plymouth-Chevrolet Story

Continued from page . 164

At Plymouth the enthusiasms are general. This might be expected: Until now, Plymouths have been chiefly noted for homely virtues. Apart from the new looks and engines, there is an evident appreciation of the car's mechanical accessibility, and of the new fire-wall mounting for the heating system, which unclutters the engine room. The body has a good deal of beefing up and sealing.

Chevrolet people are still somewhat dazed at the size of their changes, which involved redrawing nearly 95 percent of the car's blueprints. Among their special prides are the weight-paring program, especially on the engine, and the new 12-volt electrical system, the first in the field. They also feel they're onto something with a heater design where the plenum chamber measurably beefs up car structure—a first step toward integral body-frame construction. They've got a new recirculating-ball steering gear, a new generator-mounted power-steering pump.

and new over-all ratios—25.7:1 manual and 23.1 power. The rear springs, to take back-torque, are 9 in, larger.

How do they go? Each of the three is pleasant to drive, and, at the top horse-powers, distinctly invigorating. With the standard engines the cars are somewhat friskier than last year's versions but are in no sense bombs. It must be remembered that acceleration and top speed are out at the end of a mathematical lever—that it takes a whale of a lot more power to give a car a little more poop.

As for the glittering trim, the pastel paints, the vinyl bouldoirs, and the low, low look, don't be too quick to say you wouldn't have it in the driveway. Especially after the lady gets a look.

## **Still Hopeful**

The announcement that nuclear fission is being used for medical research makes us hopeful that splitting the atom may turn out to have been a wise crack after all —Wall Street Journal.

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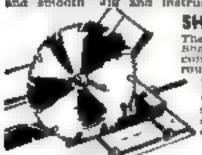
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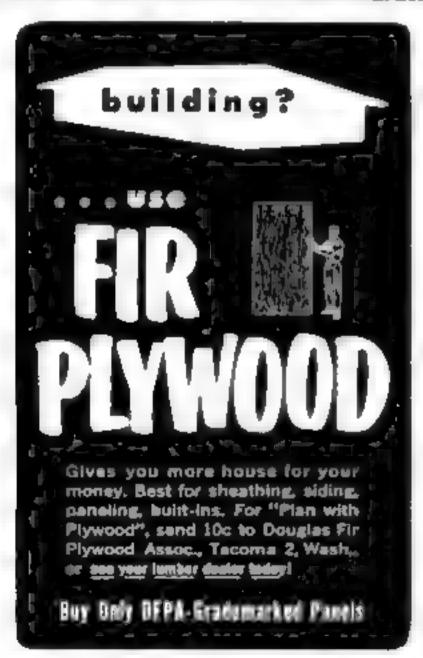
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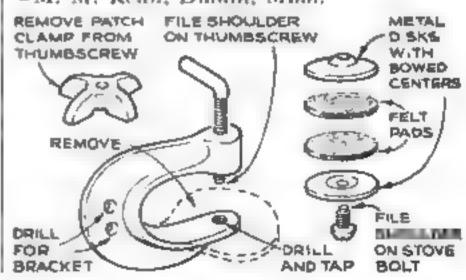


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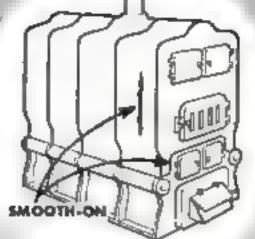
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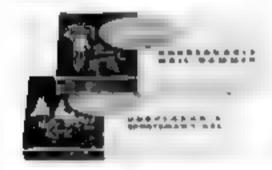
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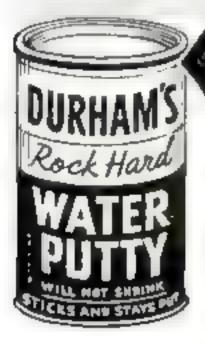
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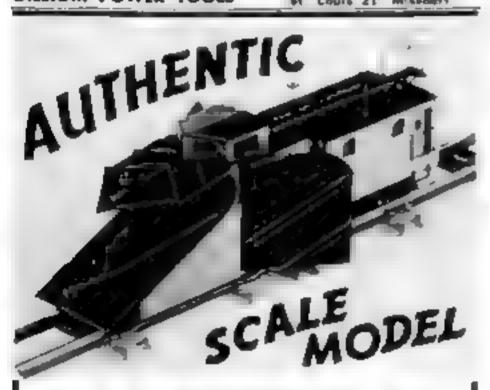
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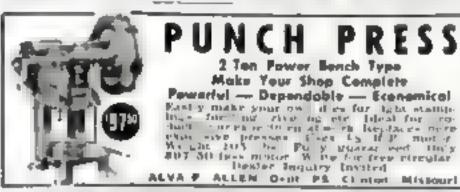
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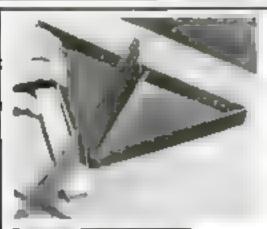
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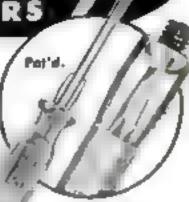
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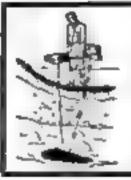
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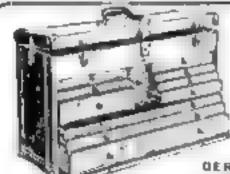




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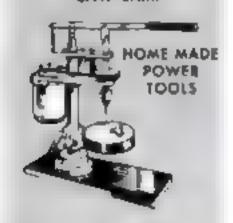
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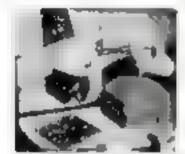
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### How Much Did You Learn?

By Stanford E. Taylor and Helen Frackenpohl

Washington Square Reading Center, New York

Now you can sample how much you remember of the useful and interesting information packed into this issue of Popular Science Monthly. Answers to the questions are printed just below the quiz. After each answer is a page reference to the article on which the question was based.

- 1. One thing '55 Ford, Plymouth and Chevrolet V-8s have in common is
  - a. more power than luxury cars of 1980
  - b, more power for size than other V-8:
  - c. optional 200 hp. "power packages"
- 2. Tool man Leighton Wilkie believes most human achievements stem from
  - a, the wheel
  - b. the primitive fist ax
  - c, the coluth
- 3. The Somascope is a new
  - a. radio telescope
  - b, electron microscope
  - c. soft-tissue X-ruy device
- 4. Churches are beginning to have a "new look"; modern architecture is used in
  - a, one out of 20
  - b. one out of 10
  - c, one out of four
- 5. The new "plank-and-beam" construction is cheap and fast, but it
  - s. can bear less over-all load
  - b. creates insulation and wiring problems
  - c. restricts size and type of house

- 6. Both high and low beams of new auto lamps are brighter because of
  - a. better reflectors
  - b. higher wattage
  - c. better lenses
- 7. An Army study of cold reveals that you can keep warm by
  - a. drinking alcoholic beverages
  - b. cating ice cream
  - e, dranking hot coffee
- 8. Of 16 V-8 engines, 11 are new since
  - a. 1952
  - b. 1944
  - c. 1936
- 9. The Northern Lights have helped radio hams, who improve reception by aiming their antennas
  - a. diagonally away from the Lights
  - b. straight at the Lights
  - e. 10 degrees cast of the Lights
- 10. Rockoons, balloon-fired rockets, can send research mechanisms up to
  - a. 150 miles
  - b. 70 miles
  - c. 50 miles

Answers: 1  $a \rightarrow p$ , 117, 2  $b \leftarrow p$ , 88, 3,  $c \rightarrow p$ , 78; 4,  $c \rightarrow p$ , 112, 3,  $b \rightarrow p$ , 153; 6,  $b \rightarrow p$ , 94; 7,  $b \rightarrow p$ , 105; 8,  $a \rightarrow p$ , 123; 9,  $b \rightarrow p$ , 100; 10,  $b \rightarrow p$ , 114,

NEXT MONTH: EXCLUSIVE FIRSTHAND REPORT ON ...

## The Ships That Prowl in Polar Seas



Reporter Herbert O. Johansen

A Popular Science reporter and photographer returned recently from a month's exploration of the Arctic by sea and air. The first of their exciting reports on that frozen frontier between Russia and America—the story of our rugged little icebreakers, illustrated with full-color photos—will appear in the January issue.



Photographer W. W. Morris

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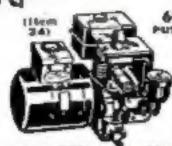
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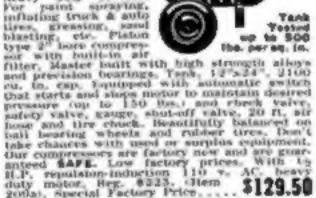
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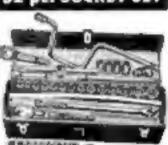


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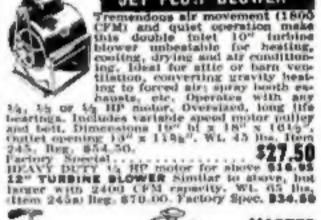
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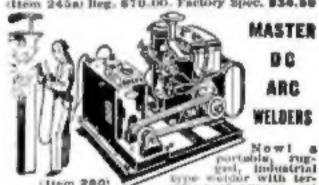
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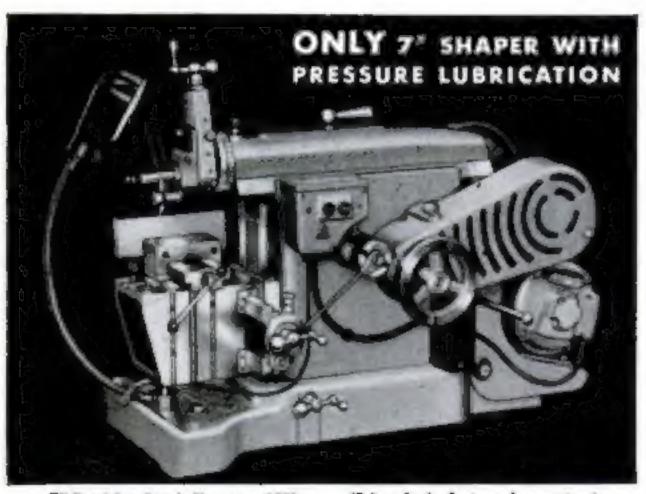
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